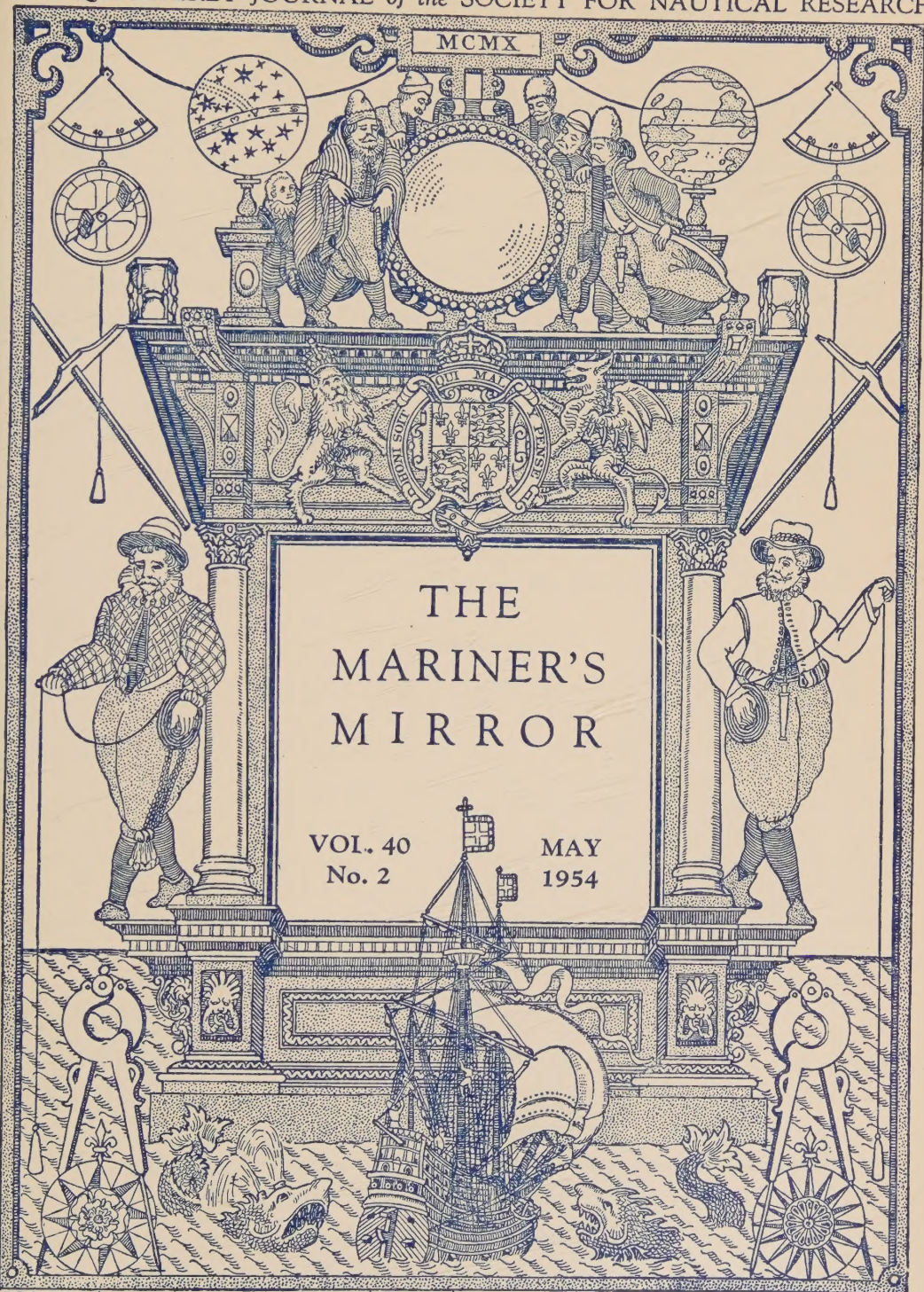


THE QUARTERLY JOURNAL of the SOCIETY FOR NAUTICAL RESEARCH



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The aim of the Society being to arrive at true conclusions through free discussion, it is distinctly to be understood that the Editor is not held responsible for statements made in the *Journal*.

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Names of ships should be underlined to denote *italics*, and not written within inverted commas.

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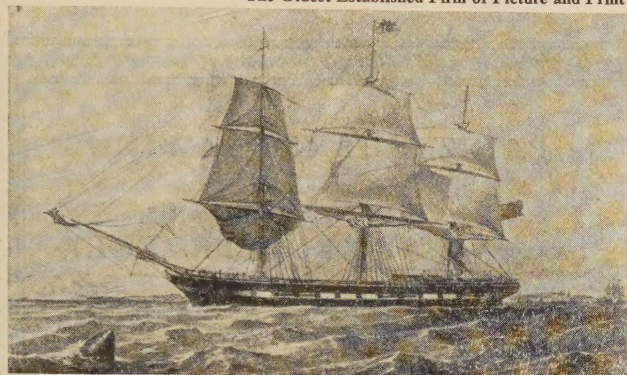
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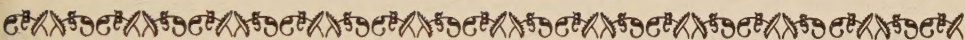
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THE SOCIETY'S ANNUAL LECTURE

THE Annual Lecture for 1953 was delivered on board the *Wellington*, the Headquarters of the Honourable Company of Master Mariners, on 12th November when Mr R. A. Skelton, F.S.A., of the British Museum, gave a lecture on Captain James Cook as a hydrographer.

The lecturer was introduced by the President of the Society, Dr R. C. Anderson, who expressed, on behalf of his fellow members, his thanks to the Honourable Company of Master Mariners for so kindly extending to the Society for Nautical Research the use of their Hall and the hospitality of the Company.

The following members and their guests were amongst those who attended:

Mr and Mrs H. R. Aldridge, Mr and Mrs R. C. Anderson, Mr N. Atherton, Sir Vincent and Lady Baddeley, Mr John Bailey, Mr J. A. Baldwin, Commander F. A. Barley, R.N.V.R., Lieut.-Commander L. M. Bates, R.N.V.R., Mr A. G. Bell, Mr H. W. Bisson, Rear-Admiral C. M. Blackman, Mr A. L. Bound, Mr E. W. Bovill, Mr and Mrs E. Bowness, Mrs Beatrice E. Bradley, Lieutenant and Mrs L. J. W. Brisley, Mr S. T. Bryden, Miss C. M. R. Callender, Miss E. G. R. Callender, Dr H. C. Cameron, Mrs S. M. Campbell, Mr W. H. Carslaw, Mrs Chaplin, Mr F. C. Chapman, Mr G. H. Cleare, Captain K. St B. Collins, Royal Navy, Captain W. H. Coombs, Miss Coppack, Admiral of the Fleet the Earl of Cork and Orrery, Mr T. E. Cresswell, Mr and Mrs C. J. Cunningham, Mr and Mrs R. H. Dolley, Captain V. D'A. Donaldson, Royal Navy, Miss D. E. Eldred, Mr H. H. Evans, Captain and Mrs Fawcett, Mr R. A. Flicker, Mr Ewart Freeston, Captain A. Grant, Royal Navy, Miss Joan Grosvenor, Mr Charles Hampshire, Mr J. N. Hampton, Mr A. W. E. Happé, Mr D. C. Harben, Colonel H. G. Hasler, Eng.-Commander H. O. Hill, Royal Navy, Mr E. H. Hinbest, Mr J. M. Howlett, Sir Maurice Holmes, Lieut.-Colonel A. J. L. Hughes, Commander H. N. Inglis, R.N.V.R., Mrs F. A. James, Mr George P. Jennings, Lieutenant P. A. Jobson, R.N.V.R., Chief Officer C. E. K. Kendall-Carpenter, Vice-Admiral Sir Richard Lane-Poole, Mr T. S. Lascelles, Mr Basil Lavis, Lieut.-Commander (S) M. C. Lawder, Royal Navy, Captain James S. Learmont, Professor and Mrs M. A. Lewis, Mr James Lightfoot, Miss K. Lindsay-MacDougall, Mr and Mrs C. C. Lloyd, Sub-Lieutenant R. C. Loram, Royal Navy, Mr R. Lowen, Miss Lysaght, Mr Norman McCord, Captain A. MacDermott, Royal Navy, Mr Norman Macleod, Commander W. E. May, Royal Navy, Commander R. D. Merriman, R.I.N., Commander and Mrs K. Michell, Mr and Mrs Charles G. Miller, Mr D. I. Moor, Mr and Mrs F. C. P. Naish, Mr and Mrs G. P. B. Naish, Mr G. O'Kieffe-Wilson, Mr G. A. Osbon, Mr C. E. Parkes, Mr F. J. Pateman, Mr S. Payne, Lieut.-Commander A. H. Phillipson, R.N.R., Mr E. A. Philp, Mrs Alice Pollock, Mrs C. E. F. Reffel, Mr A. H. W. Robinson, Mr Gregory Robinson, Lieut.-Commander N. D. Royds, Royal Navy, Mr Percy Russell, Captain C. B. Sanders, R.N.V.R., Mr and Mrs Satterthwaite, Commander J. M. Sharpey-Schafer, Royal Navy, Mrs R. A. Skelton, Miss Skelton, Mr J. C. Skelton, Eng. Vice-Admiral Sir Reginald Skelton, Captain F. A. Slocum, Royal Navy, Mr A. Smith, Miss C. Fox Smith, Brigadier F. E. Spencer, Mr G. B. Stigant, Sub-Lieutenant L. A. Stock, R.N.V.R., Mr G. H. D. Stone, Mrs M. Stuart, Professor E. G. R. Taylor, Captain Geoffrey Thorne, R.N.R., Mr E. K. Timings, Mr C. F. E. Tomlinson, Mr and Mrs Sheldon Tower, Mr C. E. C. Townsend, Mr A. G. Vercoe, Lieut.-Commander A. H. Waite, R.N.V.R., Miss Wallis, Mr Oliver Warner, Miss Williams, Captain A. R. Williamson, Dr G. Nesbitt Wood, Mr and Mrs G. R. G. Worcester, Mr S. Wurr, Miss Wykeham-Martin.

The following paper, which was illustrated with lantern slides, was then read:

CAPTAIN JAMES COOK AS A HYDROGRAPHER

By R. A. Skelton, F.S.A.

To compare Cook's merits as a marine surveyor and a discoverer is as idle as to ask whether the chicken came before the egg. Cook himself regarded both tasks as essentially one, and wrote: 'The world will hardly admit of an excuse for a man leaving a coast unexplored he has once discover'd.'¹ His tenacity as a surveyor not only explains his greatness as a discoverer. It also obtained for him the appointment to command the *Endeavour*, which opened the door on his career in discovery.

The earlier voyages to the Pacific projected by the Admiralty after the Treaty of Paris—those of Byron and Wallis—were commanded by captains of some seniority; Byron indeed had flown a commodore's broad pennant. Yet in looking for a naval officer to command the much better found expedition sent out in 1768, the Admiralty pitched upon a warrant-officer whose only command so far had been a 60-ton brig employed in coastal survey. Influence will not explain this unusual selection. We must suppose that the Lords Commissioners found in Cook the qualities of character and technical competence, for want of which earlier expeditions to the Pacific had produced comparatively meagre geographical results.

Cook's instructions derived jointly from the Royal Society and the Admiralty. To the Royal Society, in 1768, he was known as 'a good mathematician, and very expert in his business'; to the Lords Commissioners of the Admiralty as a proficient surveying officer. These were the credentials which recommended Cook for the appointment; and the early part of his career, during which they were being forged, deserves close scrutiny. The 'born surveyor' (as Admiral Wharton called Cook) had none the less to learn his craft, and this phase of his development has been skated over by most writers on Cook. Even R. T. Gould (perhaps his shrewdest biographer) admitted himself baffled by the 'mystery of when, and how, Cook managed to teach himself—there was no one available to teach him—his obviously considerable knowledge of marine surveying'.

¹ With few exceptions, my quotations from Cook's Journals are, by permission of the Council of the Hakluyt Society, taken from the text printed from Cook's holograph MSS. for the Society's forthcoming edition. This reproduces the following MSS.: first voyage, MS. in Commonwealth Library, Canberra (*ex* Bolckow); second voyage, Brit. Mus., Add. MS. 27,886; third voyage, Brit. Mus., MS. Eg. 2177A.

SUMMARY OF COOK'S EARLY CAREER

For background, let us run over the salient events and dates in Cook's career at sea before 1768.

In July 1746, at the age of 17, James Cook was bound apprentice to Mr John Walker of Whitby. In the ships of Walker and other north-country shipowners, engaged in the coal trade between London and the north and in the Baltic trade, he served for nine years; three as apprentice, about three as seaman, and about three as mate. In June 1755 Cook enlisted in H.M.S. *Eagle*, 60 guns, in which he was quickly promoted master's mate; this ship, under the command of Captain Hugh Palliser, was employed during the next two years in operations against the French in the Channel. Cook received his warrant as master in June 1757, and four months later he was drafted into H.M.S. *Pembroke*, Captain John Simcoe.

The *Pembroke*, a 60-gun ship, was in Admiral Boscawen's squadron which took part in the siege of Louisburg in June–July 1758. After the fall of Louisburg Cook had his first experience of practical survey, and the severe winter of 1758–9 at Halifax saw the beginning of his studies in astronomy and the theory of navigation, under the tutelage of Captain Simcoe.

During the summer of 1759, the *Pembroke*, under Captain Wheelock who had succeeded to her command on the death of Simcoe, was engaged in the operations in the St Lawrence river which led to the capture of Quebec. Cook was employed, with other masters of Admiral Saunders's squadron, in sounding and buoying the dangerous channels above the Ile-aux-Coudres, in piloting the fleet up to the city, and in stationing the 'catts' which served as floating batteries. In these duties he attracted the notice of Saunders and General Wolfe.

In September 1759 he was drafted as master to H.M.S. *Northumberland*, 70 guns, Captain Lord Colville. After wintering in Halifax the *Northumberland* operated in the St Lawrence, where Cook continued his surveys of the Quebec basin. From October 1760 to August 1762, on station at Halifax, he pursued his study of navigation and charted parts of the Nova Scotia and Newfoundland coasts; and after the recapture of St John's (Newfoundland) from the French in September 1762 his surveys of harbours are said¹ to have 'arrested the notice of Captain . . . Graves . . . governor of Newfoundland'.

On the return of the *Northumberland* to England in October 1762, Cook was discharged and, after a period of unemployment, he was in April 1763

¹ By Andrew Kippis, *Life of Captain James Cook* (1788), p. 8, using information received from Graves himself.

engaged to accompany Graves, then newly re-commissioned, to make surveys of the coasts of Newfoundland and Labrador. In 1763 the schooner *Grenville* (re-rigged in 1765 as a brig) was assigned as a survey vessel with Cook as master in command. Graves was in 1764 succeeded as governor by Palliser. Cook spent the summers of 1763–7 in surveying, and the winters at London in compiling and drawing his charts. Between 1766 and 1770 four of his charts, with sailing directions, were, by permission of the Admiralty, printed and published; and in 1767 his observation of an eclipse of the sun, made the previous year at the Burgeo Islands, off the south coast of Newfoundland, was communicated to the Royal Society.

In May 1768 Cook was appointed to the command of His Majesty's Bark *Endeavour*, with the rank of lieutenant. The charting on his three voyages to the Pacific, which will be described later, differed in its conditions and technique from his Newfoundland surveys.

'LEADING LINES'

From this anaemic summary we can pick out a few dominant threads.

In the first place, Cook's professional education and advancement did not follow conventional lines. In 1775 he wrote: 'I have been almost constantly at Sea from my youth, and have dragged myself (with the assistance of a few good friends) through all the Stations, from a Prentice boy to a Commander.' He had not behind him the academic discipline supplied by the Mathematical School at Christ's Hospital, for future masters and pilots, or by the Naval Academy at Portsmouth for future officers. In 1757 he obtained the Trinity House certificate in 'pilotage and practical seamanship' required for the qualification of masters in the Royal Navy, but this did not include theoretical navigation. Cook's education in mathematics, navigation and astronomy was the fruit of his own studies, which are said to have begun in the intervals between voyages during his apprenticeship.¹ He owed his quarter-deck promotion 'through the hawse-hole' to his reputation as a marine surveyor.

Second, it is significantly in association with military engineers that Cook had his earliest training and experience in survey, during the combined operations of the Louisbourg, Quebec and Newfoundland campaigns. Hydrographers were at this time rapidly absorbing the techniques of land survey, which equipped Cook in Newfoundland (like Murdoch Mackenzie in the Orkneys) to construct his marine surveys on a network of shore triangulation.

¹ The Rev. George Young relates that Walker's housekeeper allowed young Cook 'a table and a candle, that he might read or write for himself', and refers to a custom 'among the young seamen of Whitby' of attending 'a day school, or evening school, to learn the first principles of navigation' (Young, *Life and Voyages of Captain James Cook* (1836), p. 7).

Here lies a sharp distinction between Cook's charting of Newfoundland, where he was able to work from shore stations and measured bases on land, and the hydrographic work of his Pacific voyages. The thoroughness and rapidity of his running surveys in the *Endeavour* and *Resolution* testify to his skill in inshore navigation, learnt from his early training in coastal waters.

Finally, let us note that Cook's period of hydrographic activity coincided with conspicuous advances in the design and construction of instruments used for astronomical observation and navigation. Among these may be mentioned Hadley's reflecting quadrant ('a portable observatory' as George Adams called it); the sextant, developed from Hadley's quadrant by Captain John Campbell in 1757; John Bird's astronomical quadrants; Dr Gowin Knight's azimuth compasses, adopted by the Navy in 1751; Ramsden's theodolites; and the chronometers of John Harrison, with their copies by other watchmakers. All these instruments are known to have been used by Cook during his career, although in Newfoundland he had no chronometer and probably no sextant.

COOK BEFORE 1758

Only indirectly can we form an idea of Cook's professional qualifications before his service in America. In coastal shipping little more than rule-of-thumb pilotage, by the three L's and knowledge of the channels and marks, was required. In contemporary memoirs such as those of Henry Taylor (born at North Shields nine years after Cook) the standard of navigation in merchant ships is represented as low. Yet Taylor referred to the coal trade as 'that best nursery for seamen', and tells us that he 'learned navigation, and was able to keep a ship's way before I had been four years at sea.'¹ There is evidence to support Kitson's assertion that by the time of Cook's enlistment 'he had obtained more than a mere smattering of nautical knowledge'.² This no doubt embraced the 'keeping of a reckoning' and use of the quadrant; but probably only limited experience with charts and no survey work beyond the sounding of channels and anchorages.

The construction of charts was in fact neglected in the education of a navigator in the eighteenth century. The only two treatises on marine survey (those of Dalrymple and Murdoch Mackenzie) did not appear until the 1770's; contemporary manuals on navigation provided only perfunctory treatment of this topic; and we find practically no reference to chart-making

¹ Henry Taylor, *Memoirs* (1811), pp. 3, 41.

² Arthur Kitson, *Captain James Cook* (1907), p. 11. The evidence is the known facts that (a) the Walkers offered Cook the command of a ship before his last voyage from Whitby to London, (b) he was rated master's mate a month after enlistment, and (c) he was put in charge of a hired cutter on detached service from the *Eagle* in the summer of 1756.

in the surviving manuscript 'books of navigation' written (as a kind of passing-out examination) by the mathematical boys of Christ's Hospital and students of the Naval Academy.¹ Anson had, after his circumnavigation, commented on the Navy's deficiency in 'engineers' (i.e. surveyors),² and in his *Endeavour* journal Cook speaks of 'the few [seamen] I have known who are capable of drawing a chart or Sketch of a Sea coast'.

In 1757, when Cook received his first warrant as master, the Trinity House examiners found him 'qualified to take charge as Master of any of His Majesty's Ships from the Downs thro' the Channel to the Westward and to Lisbon'.³ By the Regulations of the Navy the master was charged, under the captain, with 'the care of Navigating the Ship', of maintaining her in seaworthy condition, and of keeping the log book. He was also required to take soundings round anchorages, 'to observe the Appearance of Coasts', and to plot new shoals or rocks. The journals of the period, including Cook's, repeatedly show the captain sending away his master 'to sound the Channell', 'to search for a passage', 'to look for an Anchoring place', 'Surveying and Sounding the Bay'. It is not surprising that in many ships the survey work was done by the master and not by the captain or lieutenants. The original charts⁴ of Captain Wallis's Pacific voyage in the *Dolphin* (1766-8) show that the surveys were made by Wallis's master, George Robertson, and that the captain only drew the fair copies (and signed the roughs). This seems to have been a fairly common division of labour. The midshipmen, or 'young gentlemen', were also employed, as part of their training, in drawing charts.

COOK IN THE ST LAWRENCE: FIRST SURVEYS

Cook's early zeal 'in learning his Duty' is revealed by a manuscript commonplace book in which, between 1755 and 1762, he copied down sailing directions for different parts of the world.⁵ But the vital period of his

¹ Examples of such MS. books are to be found in the following libraries: British Museum (King's MS. 273, Add. MS. 15,239), National Maritime Museum, Royal Naval College, Royal United Service Institution (Naval MS. A. 19).

² The Rev. Richard Walter, *A Voyage round the World...from papers...of the Right Honourable George, Lord Anson* (1748), Introduction. I have here assumed that the opinions on naval administration expressed by Anson's chaplain and chronicler reflect those of Anson himself.

³ Captain W. R. Chaplin, to whose kindness I owe this reference, found the record of Cook's examination in the Minute Books of Trinity House, 29 June 1757. The scope of the Trinity House examinations and the terms of the certificates, which vary considerably, seem to have borne some relation to the appointment for which a prospective master was intended.

⁴ In the Hydrographic Department, A 191/2-15 and 542/1-20.

⁵ This was among the Cook MSS. belonging to H. W. F. Bolckow of Marton Hall and sold at Sotheby's in 1923. It is now in the Dixon Library, Sydney, N.S.W. There is a description of it in Messrs Maggs Bros.' Catalogue no. 491 (1927), item 92.

training in hydrography lies in the four years following the fall of Louisburg (27 July 1758). There has been a good deal of confusion about the sources and dates of Cook's education in survey. By Kippis, Cook's first biographer, we are told that 'Sir Hugh Palliser had good reason to believe that before this time [the siege of Quebec] Mr. Cook had scarcely ever used a pencil, and that he knew nothing of drawing'. According to Captain King, writing after Cook's death, it was in 1758, 'as I have often heard him say, that during a hard winter he first read Euclid, and applied himself to the study of mathematics and astronomy, without any other assistance than what a few books and his own industry afforded him'. Two distinguished military engineers, Samuel Holland and J. F. W. Des Barres, with both of whom Cook certainly carried out surveys, seem to have competed—after Cook became famous—for the honour of teaching him. It has been asserted¹ that 'Cook... was instructed by Des Barres in the art of making maritime surveys' at Halifax in that winter of 1758–9; Holland (a more modest and candid witness than Des Barres) has a better and earlier claim, and he gave most of the credit to Captain Simcoe.

Holland's statement is contained in a letter, dated from Quebec 11 January 1792, to Captain Simcoe's son, John Graves Simcoe, then newly appointed Lieutenant-Governor of Upper Canada. As this letter has been overlooked by all Cook's biographers, I make no apology for quoting from it at some length:²

Lt.-Governor Simcoe, York.

Quebec, 11th January, 1792.

Sir,

It is with the most sincere pleasure that I recall to memory the many happy and instructive hours I have had the honor of enjoying in your late most excellent father's company, and with more than ordinary satisfaction do I recollect the following circumstance which gave birth to our acquaintance. The day after the surrender of Louisbourg, being at Kensington Cove surveying and making a plan of the place, with its attack and encampments,³ I observed Capt. Cook (then master of Capt. Simcoe's ship, the *Pembroke* man of war) particularly attentive to my operations; and as he expressed an ardent desire to be instructed in the use of the Plane Table (the instrument I was then using) I appointed the next day in order to make him acquainted with the whole process; he accordingly attended, with a particular message from Capt. Simcoe expressive of a wish to have been present at our proceedings; and his inability, owing to indisposition, of leaving his ship; at the same time requesting me to dine on board; and begging me to bring the Plane Table pieces along. I, with much pleasure, accepted that invitation, which gave rise to my acquaintance

1 By Robert Harrison in *D.N.B.*, followed by J. C. Webster and other writers on Des Barres. I have not discovered the source of this assertion; it is not in the *Statement* of his services and claims prepared by Des Barres in 1795.

2 Holland's letter to J. G. Simcoe was first printed by H. Scadding, 'A Notice of Samuel Holland' (*Canadian Magazine*, October 1895); reprinted by Willis Chipman, 'The Life and Times of Major Samuel Holland' (Ontario Historical Society, *Papers and Records*, Vol. xxi (1924), pp. 11–90).

3 Holland's plan was perhaps the original of that published by Jefferys, 9 October 1758.

with a truly scientific gentleman, for the which I ever hold myself indebted to Capt. Cook. I remained that night on board, in the morning landed to continue my survey at White Point, attended by Capt. Cook and two young gentlemen. . . . During our stay at Halifax, whenever I could get a moment of time from my duty, I was on board the *Pembroke* where the great cabin, dedicated to scientific purposes and mostly taken up with a drawing table, furnished no room for idlers. Under Capt. Simcoe's eye, Mr. Cook and myself compiled materials for a chart of the Gulf and River St Lawrence, which plan at his decease was dedicated to Sir Charles Saunders; with no other alterations than what Mr. Cook and I made coming up the River. Another chart of the River, including Chaleur and Gaspé Bays, mostly taken from plans in Admiral Durell's possession, was compiled and drawn under your father's inspection, and sent by him for immediate publication to Mr. Thos. Jeffrey, predecessor to Mr. Faden. These charts were of much use, as some copies came out prior to our sailing from Halifax for Quebec in 1759. By the drawing of these plans under so able an instructor [i.e. Simcoe], Mr. Cook could not fail to improve and thoroughly brought in his hand as well in drawing as in protracting, etc., and by your father's finding the latitudes and longitudes along the Coast of America, principally Newfoundland and Gulf of St Lawrence, so erroneously heretofore laid down, he was convinced of the propriety of making accurate surveys of these parts. In consequence, he told Capt. Cook that as he had mentioned to several of his friends in power, the necessity of having surveys of these parts and astronomical observations made as soon as peace was restored, he would recommend him to make himself competent to the business by learning Spherical Trigonometry, with the practical part of Astronomy, at the same time giving him Leadbetter's works, a great authority on astronomy, etc.,¹ at that period, of which Mr. Cook assisted by his explanations of difficult passages, made infinite use, and fulfilled the expectations entertained of him by your father, in his survey of Newfoundland: Mr. Cook frequently expressed to me the obligation he was under to Captain Simcoe and on my meeting him in London in the year 1776, after his several discoveries, he confessed most candidly that the several improvements and instructions he had received on board the *Pembroke* had been the sole foundation of the services he had been enabled to perform. . . .

Samuel Holland.

From this we learn that in July 1758 Cook was unfamiliar with so rudimentary an instrument for land survey as the plane table (an ignorance which he apparently shared with his captain!), and that Simcoe not only gave Cook and his midshipmen opportunities for practice in survey and cartography with Holland, but also took in hand Cook's instruction in trigonometry and astronomy 'during our stay in Halifax' (the 'hard winter' of which King wrote).

Holland refers to the practice 'as well in drawing as in protracting' that Cook received under Simcoe, and to Cook's collaboration with himself in the compiling of two charts of the Gulf and River St Lawrence. These were evidently the originals of the large chart, on a scale of 1 in. to a mile, printed by Jefferys in 1760 with the title 'A New Chart of the River St Lawrence. . . . Taken by order of Charles Saunders Esqr. Vice-Admiral of the Blue. . . . Published by Command of. . . the Lords Commissioners of the Admiralty'. Admiral Saunders informed the Admiralty on 22 April 1760 that he had ready for publication a 'Draught of the River St. Lawrence', and

¹ Charles Leadbetter, author of—among other books—*A Compleat System of Astronomy* (1728) and *The Young Mathematician's Companion* (1739).

the chart as published bore a note on its compilation signed by him from 'Pall Mall, May 1st 1760'.¹ Saunders's note states that 'the Distances between the Island of Coudre, the Island of Orleans, the Pillar Rocks, and Shoals in the South Channel were accurately determined by 'Triangles'. Kitson, in his life of Cook, comments that 'the triangulation... argues much greater knowledge of nautical surveying than he was supposed to have acquired at that time'; but we have the plain statement of Holland that the chart is here drawn from the surveys made jointly by him and Cook 'coming up the river'. In the sieges of Louisburg and Quebec military engineers like Holland and Des Barres worked hand-in-hand with the navigating officers of the fleet; and Holland's plane table on 28 July 1758 admitted Cook to the course of instruction in trigonometrical survey which he received during the next three or four years from the best master then available—the military engineer.

The St Lawrence chart of 1760 is the first printed chart incorporating surveys by Cook. His further surveys of the river, made in May–August 1760, are recorded in his earliest surviving manuscript chart, that of the river 'from Green Island to Cape Carrouge', on a scale of 0.9 in. to a mile. Of the three known copies,² only one, inscribed to Lord Colville, is apparently from Cook's own hand; and in January 1761 Cook was rewarded by Colville for his 'indefatigable industry in making himself master of the pilotage of the River of St. Lawrence'.

In the autumn of 1762 Cook accompanied Des Barres to make surveys in Conception Bay and (Colville reported) 'has made draughts of Harbour Grace and the Bay of Carbonera'; he also surveyed Placentia road and harbour. These plans, according to Kippis, introduced Cook to Graves; and his hydrographic work also became known at the Admiralty, to which Colville wrote on 30 December 1762;³ 'Mr. Cook, late Master of the *Northumberland*, acquaints me that he has laid before their Lordships all his draughts and observations relating to the River St. Lawrence, part of the coast of Nova Scotia, and of Newfoundland... I beg to inform their Lordships that from my experience of Mr. Cook's genius and capacity, I think him well fitted for the work he has undertaken and for greater undertakings of the same kind....'

¹ The copies which, according to Holland, reached Halifax before May 1759 may have been advance pulls from the plates in an early state, before revision from the surveys of Holland and Cook in the river. On 15 May 1759 Saunders issued to the masters of transports 'a plan or chart showing the route which His Excellency intends to make from Louisbourg Harbour to the Island of Bic' (Kitson, *Cook*, p. 38).

² The Hydrographic Department has two copies; the third is in a Canadian collection.

³ Quoted from Kitson, *Cook*, pp. 59–60.

THE NEWFOUNDLAND SURVEY, 1763-7

At Captain Graves's instance, Cook was in April 1763 selected 'to go out to survey the Harbours and Coasts' of Newfoundland and Labrador; he was to be provided with a 'draughtsman...from the Tower' and with suitable instruments. Such an appointment was at this time outside the regular naval establishments. Captains, like masters, had a general obligation 'to observe all coasts, shoals, and rocks, taking careful note of the same'; but the Admiralty (as Anson had remarked in 1748)¹ disposed of no such regular surveying service as that provided for the Army by the military engineers of the Corps of Ordnance, or for the Board of Trade and Plantations by the civilian surveyors employed in America.² It did not possess an organized repository for the charts drawn by sea officers, and no provision was made for the compilation and issue of charts to ships. In general, surveys were left to the personal initiative of pilots, masters, Trinity House officers, and the like; and their publication to the commercial enterprise of firms such as Mount and Page, Thomas Jefferys, and Robert Sayer. Even charts commissioned by the Admiralty or prepared in the course of duty by naval officers were engraved and issued by such tradesmen. The Navy was on the whole not well-served by the commercial map publisher, who was often mainly concerned to extend the profitable life of his copper-plates, even when their hydrographic information was out-of-date; and it is worth noticing that Cook's printed charts were published in 1766-8 *at his own risk*, so that the plates remained his property. In spite of proposals for the establishment of a Hydrographic Office adumbrated by Anson in 1748, by John Hamilton Moore about 1760, and by Lord Howe about 1765,³ these were the conditions prevailing in Cook's day, and (like other sailors) he said some hard words about 'the Compilers and Publishers who publish to the world the rude sketches of the Navigator as accurate surveys' and who omitted information about the reliability of the survey 'because they say it hurts the sale of the work'.

1 Walter, *Voyage round the World* (1748), Introduction.

2 Extraordinary provision was sometimes made for survey of a particular coast, e.g. of Georgia by Captain James Gascoigne from 1735; of Ireland and the west coasts of Great Britain by Murdoch Mackenzie from 1751; of Newfoundland by Cook; of Florida by George Gauld from 1764; and of the Atlantic seaboard of North America by Des Barres, Holland, Hurd and others (incorporated in *The Atlantic Neptune*, 1778).

3 Walter, doubtless depending on Anson's 'papers', cites the example of the French Dépôt des Cartes et Plans de la Marine founded in 1720 (*Voyage round the World* (1748), Introduction). Moore's recommendation was apparently made during Anson's second term as First Lord (J. H. Moore, *The Practical Navigator*, ed. 9 (1791), p. 251). Howe's negotiation with Egmont is recorded in an autobiographical article by Dalrymple in *The European Magazine*, Vol. XLII (1802), pp. 324*-5*. I owe the last reference to Mr George Naish.

By 1763 Cook was plainly convinced of the greater precision of coastal surveys constructed on a system of measured bases and angles observed

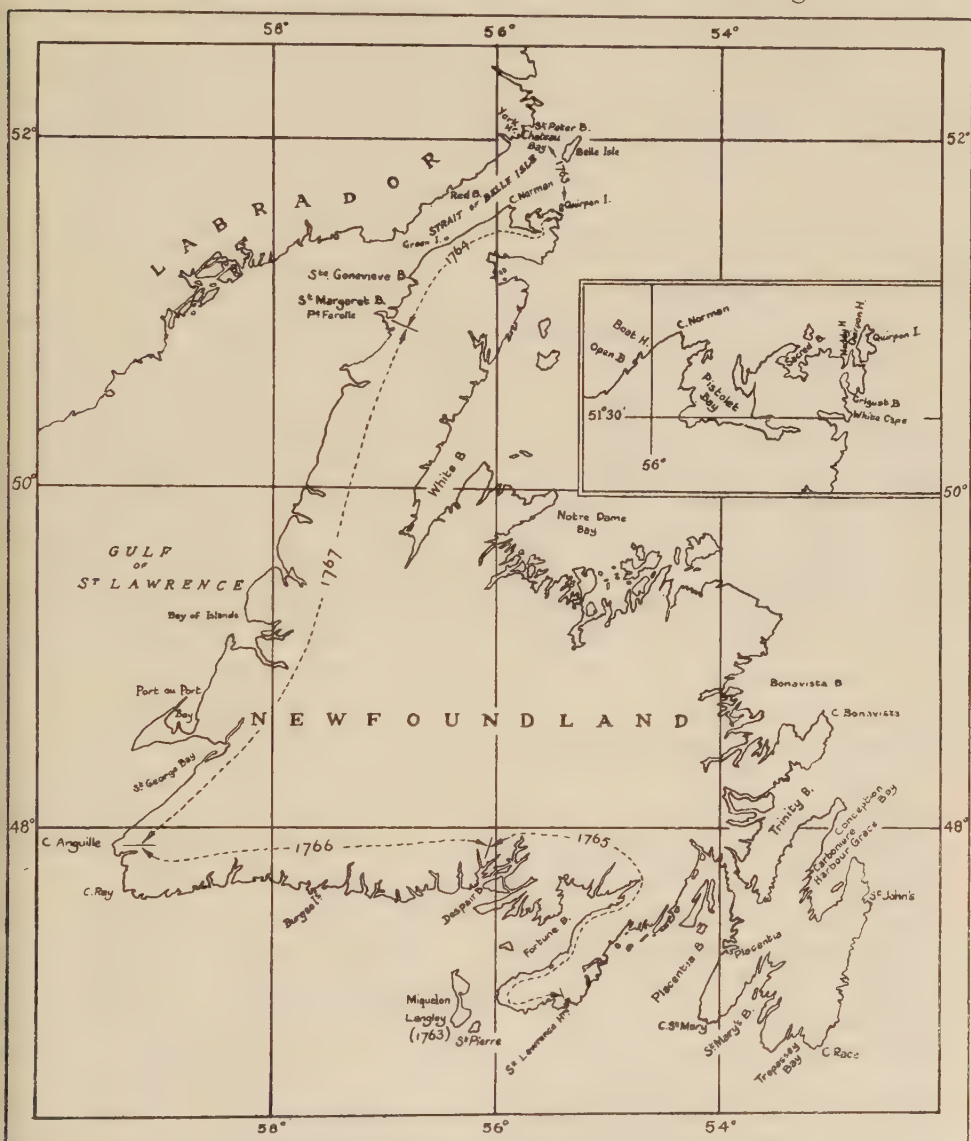


Fig. 1. Cook's charting of the coasts of Newfoundland, 1763-7.

from stations occupied on land. Graves's letters to the Admiralty, written after conversations with Cook at the beginning of April 1763, show clearly the type of survey that Cook planned.¹ Cook (we learn) 'has been to enquire

¹ The quotations from Graves's letters to the Admiralty are taken from Kitson, *Cook*, chap. v.

for a draughtsman at the Tower [the headquarters of the Board of Ordnance]'; unluckily (for these were civil servants) 'as this is a Holiday, he found hardly anyone there'. Cook's choice of a military draughtsman as his assistant is significant. The 'surveying draughtsmen' of the Ordnance not only compiled and drew maps, they were also qualified surveyors employed in all the instrumental fieldwork of trigonometrical and topographical survey. 'It is from this class [Graves adds] they always send Draughtsmen with Engineers or Commanding officers who go abroad.'¹

Cook's choice of equipment is no less illuminating. From his Royal Society communication we learn that he 'took with him a very good apparatus of instruments, and among them a brass telescopic quadrant made by Mr. John Bird'. Graves (doubtless at Cook's dictation) desired the Admiralty to provide 'a Theodolite and drawing instruments, which... is a thing the Ordnance always allow their people' (again military survey is quoted as a precedent); and in 1763 and 1764 'small station flags' were called for, 'to put as signals on different points for taking the angles as the survey goes on'. In stipulating for a theodolite Graves (and Cook) made it plain that the survey would be conducted by observation of the principal angles from shore stations and not by a running traverse from the ship.

The *Grenville* log (1764-7) and Cook's original charts of 1763-7 provide further evidence on the character and progress of his surveys,² although in neither do we find a record of his principal stations, and his field books have not survived. He styles his manuscript chart of the west coast of Newfoundland 'an exact trigonometrical survey'; and on that of the coast between Green Island and Point Ferolle, 'copy'd from the original survey taken... in 1764', are drawn the triangles observed by him (Pl. I, *a*).³ Other manuscript charts have a symbol marking 'the centre of the Instrument where the Latitude is determined by an astronomical observation'.

Cook's operations in the season of 1764, as described in his journal, show us how he went to work (Fig. 1). Starting his survey in the north, on 14 July, he 'went into the Bay Sacre, measured a Base Line and fix'd some Flaggs on the different Islands, etc.'. On 20 July he 'Finish'd the Survey of Sacre Bay and Islands'. Pistolet Bay, to the west, was similarly surveyed

¹ Difficulties about pay however upset Graves's proposal, and he recruited as Cook's assistant a Mr Edward Smart of whom, before his death in March 1764, we hear only as 'drawing fair copies' with his brother. (Admiralty to Navy Board, 23 April 1764. N.M.M., Adm/A/2558.)

² The Master's log and journal of the *Grenville* are in the Public Record Office, Adm. 52/1263. The Hydrographic Department has some sixteen charts from Cook's surveys (*Summary of Selected Manuscript Documents... in the Archives of the Department* (Prof. Paper No. 13, 1950), pp. 7-10); the British Museum 6 more (Add. MS. 17,693, from the Duke of Sussex's library; K. Top. cxix. 111, in King George III's collection).

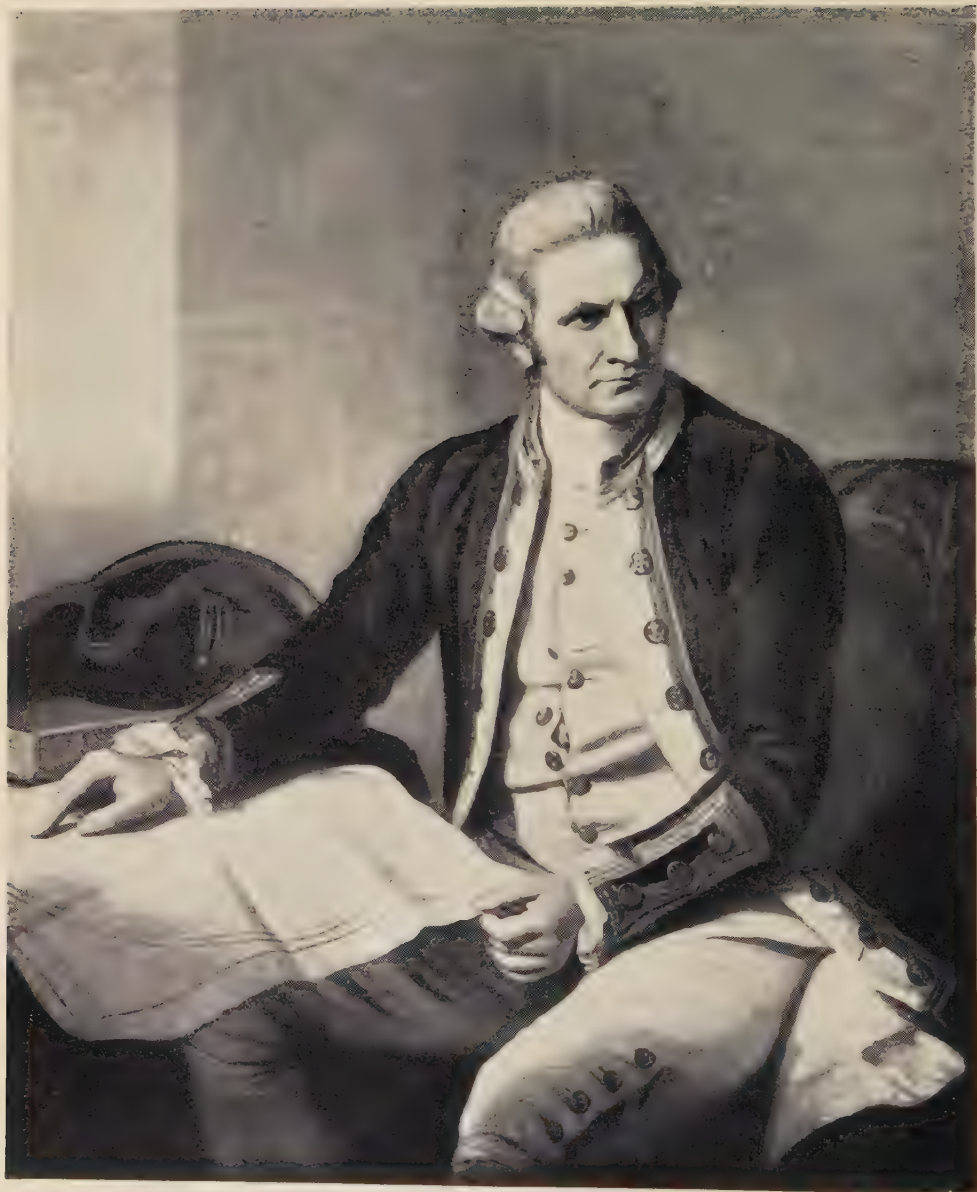
³ H.D. C 54/1, west coast of Newfoundland, C. Anguille to Point Ferolle, 1767; H.D. 342, coast between Green Island and Point Ferolle, with triangles, 1764.



(a) Detail, showing lines of construction, from 'A Chart of the Sea coast, Bays and Harbours, in Newfoundland between Green Island and Point Ferrolle. Surveyed by James Cook. Copy'd from the original survey taken in y^e year 1764.' (Hydrographic Dept. MS. No. 342). Reduction about $\frac{1}{4}$.
(Reproduced by courtesy of the Hydrographer)



(b) Chart of the Bay of Tahiti (Brit. Mus. Add. MS. 7085 fol. 8). Reduction



Portrait of CAPTAIN JAMES COOK, by Nathaniel Dance, 1776. Cook is depicted with a polar zenithal chart of his second Pacific voyage

(Reproduced by courtesy of the Trustees of the National Maritime Museum)

and by 31 July he had completed the survey as far as Cape Norman, the latitude of which ($51^{\circ} 39' \text{ N.}$) was determined by a meridional observation on 2 August. From Cape Norman south-west to Point Ferolle the survey was continued, evidently in the same way, to the end of the season: Cook carefully planned a harbour from a small measured base, fixing points by triangulation with the theodolite as far afield as possible, and then ran for the next harbour sounding and sketching in the coast-line and fixing the ship's position by quadrant angles or compass bearings on the shore stations determined by the theodolite observations. The latitude, particularly of headlands and other prominent coastal features, was whenever possible observed by quadrant, and variation with the azimuth compass; the distances between such stations, computed from their latitude and true bearing from one another, provided more extended base-lines and a means for adjusting the trigonometrical survey.

This general picture can be filled in by inference from the contemporary practice of Mackenzie and Dalrymple.¹ Mackenzie's description of a 'stasi-metric survey' (Fig. 2), in chapter II of his *Treatise of Maritim Surveying* (1774), may be taken to reflect Cook's procedure pretty closely. A level base was measured by pole or chain. The primary triangles on land were observed by theodolite; and subsidiary stations, shoals, soundings and anchorages plotted by cross-rays with the compass or by angles taken with sextant or theodolite. The principle of the station pointer fix had been described in 1765 in the Rev. John Michell's Royal Society paper, 'A Recommendation of Hadley's Quadrant for Surveying, especially the Surveying of Harbours';² and, even earlier, quadrant and sextant were in use for taking horizontal angles. Mackenzie recommended the sextant as being 'more portable. . . and generally more accurately. . . divided' than the theodolite. And Dalrymple remarked that Hadley's quadrant 'is used with equal facility at Mast-head as upon Deck, and therefore the Sphere of Observation is. . . much extended. . . . Taking Angles from Heights, as Hills, or a Ship's Mast-head, is almost the only way of exactly describing the Extent and Figure of Shoals.' Inland topography, the careful drawing of which in Cook's early charts was praised by Kippis, may have been plotted graphically on the plane table, which Cook had with him in the *Endeavour* and probably also in Newfoundland.

Cook was of course not the first marine surveyor to apply the technique of a trigonometrical land survey to the charting of a coast line, although we may credit him with the independent discovery of its virtues during his

¹ Alexander Dalrymple, *Essay on the most Commodious Methods of Marine Surveying* (1771); Murdoch Mackenzie (the elder), *A Treatise of Maritim Surveying* (1774).

² *Philosophical Transactions*, Vol. LV (1765), pp. 70-8.

upon.¹ Yet it is clear that the hydrographic technique adopted in Newfoundland was determined by Cook and Graves, and not defined in their orders from the Admiralty.

The history of Cook's work in Newfoundland may be briefly told (Fig. 1). In June 1763 'Mr. James Cook, Engineer and Retinue' were sent from St John's in H.M.S. *Tweed* to survey the islands of St Pierre and Miquelon before they were handed over to the French under the terms of the Treaty of Paris. In the *Grenville* schooner, which Graves had meanwhile purchased,² Cook spent the rest of the season surveying harbours at the eastern entrance of the Strait of Belle Isle.³ In October he was sent home to complete his draughts (now in the Hydrographic Department) and to lay them before the Admiralty.⁴

In April 1764 the Admiralty authorized a complement for the *Grenville* as a survey vessel, with Cook as master and William Parker as master's mate. During this summer, both shores of the Strait of Belle Isle and the Newfoundland coast as far south as Point Ferolle were surveyed, with the courses of some rivers. The *Grenville*, after being square-rigged at Deptford as a brig, was in the summer of 1765 engaged in surveying the eastern section of the south coast. In February 1766 Cook (through Palliser) obtained the Admiralty's leave to publish his charts, two of which, from his surveys of 1764-5, were printed during the year. In the summer of 1766 the survey of the south coast was completed, and on 5 August Cook observed the solar eclipse at the Burgeo Islands. In 1767 (now with Michael Lane, schoolmaster of H.M.S. *Guernsey*, as mate) Cook charted the west coast

1 An interesting report from the Navy Board to the Admiralty dated 25 July 1754 (N.M.M., Adm/B/148) lists the instruments delivered to Mackenzie in May 1751, and gives an account of the issues of survey equipment to H.M. ships since 1734. These were made in 1734/5 'for the use of Mr. Henry Woodyer in H.M.S. *Dunkirk* for finding out the longitude'; in 1735 to Captain James Gascoigne, H.M.S. *Hawk*, 'for surveying the coasts and harbours about Georgia'; and in 1740 to Captain Anson, H.M.S. *Centurion*, whose instruments included a theodolite, plane table, and chain. (This document, like others in the N.M.M. collection, was found for me by Miss K. Lindsay-MacDougall, to whom I am greatly indebted.) Wallis in 1766 also carried instruments for trigonometrical survey from shore observations; George Robertson, master of the *Dolphin*, wrote (9-10 January 1767): 'This two days I was Employed surveying Port Famin Bay and the Capt. ordered the most of our young Gentlemen to assist me in careing the Thurtolte Chain Pins &c.'

2 Originally named the *Sally*, she was purchased by Graves in July 1763 for £327. 15s.

3 Graves to Admiralty, 20 October 1763: 'The moment the schooner . . . was ready Mr Cook proceeded in her to survey Quirpoon and Noddy Harbours and from thence to York Harbour to take a compleat survey of that or any other good harbour he should fall in with on the Labrador coast.' (N.M.M., Graves MSS.)

4 Cook was 'ordered to draw a fair copie of St Peter's and Miquelong to be laid before the King'; this is now among King George III's maps in the British Museum (K. Top. cxix. 111). Grenville offered Cook a post as 'one of the surveyors to the Natral Islands [*sic*] which I was obliged to decline' (Cook to Graves, 13 March 1764; Graves MSS.).

from Cape Anguille to Point Ferolle, thus linking his surveys of 1766 and 1764. During this season he employed local men 'to point out... hidden dangers'. In February 1768 he received permission from the Admiralty to publish the charts of his last two seasons' work.¹ On 12 April 1768 Lane was appointed 'to act as Master of the brig *Grenville*' in Cook's absence on employment 'elsewhere'.

The high quality of Cook's survey of 'a practically unknown shore', deeply indented and notorious for bad weather, has been stressed by all qualified writers. It was not superseded until, over a century later, a new Admiralty survey was made (1871-81). Captain H. W. Bayfield, who spent thirty years on survey work in the Gulf and River St Lawrence, writing to the Admiralty Hydrographer in 1849,² observed that 'there are none of the old charts that can with any degree of safety be trusted by the seamen, excepting those of Cook and Lane'; and in his Journal, while on the west coast of Newfoundland in 1835, Bayfield remarked that 'the chart of Red Island and adjacent coast, soundings, etc., by... Captain Cook is extremely correct. If, in the style of drawing his charts, the nature of the coast, cliffs etc., had been shown, the survey would have been perfect.' On this passage, a later surveying officer, Captain V. G. Boulton, commented: '... while assisting in the survey of the coast of Newfoundland, from 1871 to 1881, we had the same opinion of Cook's work'. Few marine surveyors of the eighteenth century earned such bouquets from their successors.

PREPARATION FOR THE PACIFIC

The surveys of Cook's three Pacific voyages may be more briefly examined. A short but excellent appraisal of them was given by Admiral Douglas in his address to the Royal Geographical Society at the bicentenary celebrations in 1928.³ Moreover, Cook's hydrographic work in the Pacific, although it stood the test of time, was necessarily a compromise between his standards and his opportunities. He himself, while making a sketch survey of an island in the New Hebrides in August 1774, noted in his Journal: 'The word survey is not to be understood here in its literal sense,

¹ The four charts by Cook printed before 1770 were those of (a) 'Straights of Bellisle', publ. 1766; (b) 'part of the South Coast of Newfoundland, including... St Peter's and Miquelon', publ. 1766; (c) 'part of the South Coast of Newfoundland, with the Southern Entrance into the Gulf of St Lawrence', engr. 1767; (d) 'the West Coast of Newfoundland', publ. 1768. All were on a scale of 1 in. to a mile, and were published by Cook himself with sailing directions. Sayer and Bennett published revised editions of (a) in 1770, of (b) and (c) combined in 1774, and of (d) in 1770; and the three charts, together with the St Lawrence chart of 1760 and Cook's plans of Placentia and other harbours, were reissued by W. Faden in *The North American Pilot* (1775), with a prefatory letter by Cook.

² Quoted by Captain J. G. Boulton, *Admiral Bayfield* (Lit. and Hist. Society of Quebec, 1909).

³ 'Cook as an Hydrographical Surveyor' (*Geogr. J.*, Vol. LXXIII (1929), pp. 110-16).

surveying a place, according to my idea, is taking a Geometrical plan of it, in which every place is to have its true situation, which cannot be done in a work of this kind.'

In the *Endeavour* Cook was, with the astronomer Charles Green, to observe at Tahiti the transit of the planet Venus across the sun; and his additional secret instructions required him to search for the continent believed to lie to the south of the tracks of former navigators. Sailing in August 1768, he returned in July 1771. Promoted captain, he made his second voyage to the Southern Ocean (July 1772–July 1775) in the *Resolution*, with the *Adventure*, Captain Tobias Furneaux, as consort. This voyage pushed the conjectural continent into higher latitudes, and Cook three times crossed the Antarctic Circle. The last voyage, on which (now a post captain) he sailed in July 1777 in the *Resolution*, accompanied this time by the *Discovery*, Captain Charles Clerke, was 'to find out a Northern Passage by sea from the Pacific to the Atlantic Ocean'. After navigating the north-west coast of America, from 44° N. to above 70° N., and both sides of Behring Strait, Cook was killed at Hawaii on 14 February 1779.

In the Instructions for each of the voyages, the references to survey are practically identical in wording. On the discovery of land or islands, Cook was directed to explore 'as great an extent of it as you can, carefully observing the true situation thereof both in latitude and longitude, the variation of the needle, bearings of headlands, height, direction and course of the tides and currents, depths and soundings of the sea, shoals, rocks etc., and also surveying and making charts and taking views of such bays, harbours and different parts of the coast and making such notations thereon as may be useful either to navigation or commerce'.¹

For this programme Cook was generously fitted out. His ships had, like their commander, been employed in the coastal navigation of the North Sea, and they were (as he wrote) 'of a construction of the safest kind, in which the officers may, with the least hazard, venture upon a strange coast'. For running surveys, in which the importance 'of keeping the Coast aboard' was always in Cook's mind, a shallow-draught ship that would 'take the ground well' was a necessity. Without it the risks which he took along the Great Barrier Reef in 1770 would have led to disaster; and he admitted, on shooting the *Endeavour* through the Reef for the second time, that 'I have engaged more among the Islands and shoals upon this coast than may be thought with prudence I ought to have done with a single Ship... but if I had not we should not have been able to give any better account of the one half of it than if we had never seen it'.

¹ In the 'additional secret instructions' for the *Endeavour* voyage, dated 30 July 1768. (P.R.O., Adm. 2/1332. Printed by the N.R.S., *Naval Miscellany*, Vol. III (1928), pp. 347–50.)

Cook was no less well equipped with instruments for survey and astronomical observation. These were built by the best 'Mathematical Instrument makers' of the day—Bird, Nairn, Dollond, Ramsden, Adams—to whom he paid tribute for 'the improvements and accuracy with which they make their Instruments'. From various sources¹ we can make a pretty complete inventory of the instruments that he and his astronomers carried with them in the Pacific. Among those required specifically for survey (besides the quadrants, sextants and compasses) we note a theodolite, a plane table, and a Gunter's chain. Cook thus prepared himself for trigonometrical survey as in Newfoundland; but his opportunities for this were to be limited to the charting of a few harbours and short adjacent sections of coast.

COOK'S CHARTING IN THE PACIFIC

The principal surveys carried out in the *Endeavour* and in the *Resolution* and her consorts may be briefly enumerated.

First Voyage, 1768–1771

Le Maire Straits (Jan. 1769); Society Islands (April–July 1769); New Zealand (North Island, Oct. 1769–Feb. 1770; South Island, Feb.–March 1770); east coast of Australia (April–Aug. 1770).

Second Voyage, 1772–1775

Tasmania (*Adventure*, (March 1773); New Zealand (corrections to chart of 1769–70, May–June, Nov. 1773); Friendly Islands, Tongatabu group (Oct. 1773); Easter Island (March 1774); Marquesa Islands (April 1774); Friendly Islands, Nomuka group (June 1774); New Hebrides (July–Aug. 1774); New Caledonia (Sept. 1774); Tierra del Fuego and Statenland (Dec. 1774–Jan. 1775); South Georgia and part of S. Sandwich Islands (Jan. 1775).

Third Voyage, 1776–1780

Kerguelen Island (Dec. 1776); Tasmania (corrections to chart of 1773, Jan. 1777); Friendly Islands (re-surveyed April–July 1777); Society Islands (re-surveyed July–Dec. 1777); Christmas Island (Dec. 1777); west coast of North America northwards from 44° 13' N, Aleutian Islands and Behring Strait (March–Sept. 1778); Sandwich Islands (Nov. 1778–March 1779).

The conditions in which Cook's surveys were made are indicated by two passages in the Journal of his first voyage. Of his chart of New Zealand he wrote: 'The Coast as it is laid down from Cape Saunders to Cape South and even to Cape West is no doubt in many places very erroneous as we hardly ever were able to keep near the shore and were some times blown off

¹ For the first voyage: minutes of Royal Society Council, 5 May 1768 (quoted by Kitson, *Cook*, p. 91); Cook's letters to the Admiralty dated 8, 20, 25 and 28 July 1768 (P.R.O., Adm. 1/1609). For the second voyage: Wales and Bayly, *Original Astronomical Observations* (1777), pp. vi–viii. For the third voyage: list of instruments and books delivered to Cook 22 May 1776 (N.M.M., Maskelyne MSS.); Cook, King and Bayly, *Original Astronomical Observations* (1782), p. v.

altogether.' And on passing through the reefs off New Holland into the open sea on 14 August 1770 he noted that he had been 'intangled among [shoals]. . . ever since the 26th of May, in which we have saild 360 Leagues without having a Man out of the cheans heaving the Lead. . . a circumstance that I dare say never happen'd to any ship before'.

Nevertheless, the rapidity of the surveys is no less remarkable than their accuracy. On the first voyage the coasts of New Zealand—2400 miles—were charted in six months and the east coast of Australia—2000 miles—in four months. On the second voyage the New Hebrides group, extending over six degrees of latitude, was surveyed in six weeks; and the north-east coast of New Caledonia—some 300 miles—in under four weeks. On the third voyage over 3000 miles of the Pacific seaboard of North America (with two major breaks) were charted in little over four months.

Cook's charts are in general notably correct in outline and accurate in their latitudes. If we compare his chart of New Zealand with the modern chart (Fig. 3), it will be seen that the errors in longitude seldom exceed half a degree except in the north of the South Island. We must remember that, when he sighted New Zealand, Cook's dead reckoning was some four degrees short of the ship's position; and that the longitudes taken in the *Endeavour* were less dependable than those of later voyages. In 1773, Wales's observations showed that Green's longitude for Queen Charlotte Sound was 40' too far east, 'by which it appears [wrote Cook] that the whole of Tavai-Poenammoo [South Island] is laid down 40' too far East in the. . . Chart. . . but the error in Eahei-Nomauwe [North Island] is not more than. . . 30' because the distance between Queen Charlotte's Sound and Cape Pallisser has been found to be greater by 10' of Longitude than it is laid down [by dead reckoning] in the Chart'.

LATITUDE AND LONGITUDE

When, as most often, shore stations could not be occupied or fixed by regular triangulation, the framework of Cook's surveys was necessarily the astronomically determined positions of the ship and of coastal features; and the scale of his charts was derived, not from measured bases on shore or at sea, but from the computed distances between these fixes to which the ship's dead reckoning, from compass and log, was adjusted. The importance attached to the astronomical observations may be inferred from the lavish kits of instruments supplied for all three expeditions, mostly on loan by the Astronomer Royal and Board of Longitude, and from the seconding of competent astronomers from the Royal Observatory to accompany Cook. In the *Endeavour* he had Green; on the second voyage, Mr William Wales

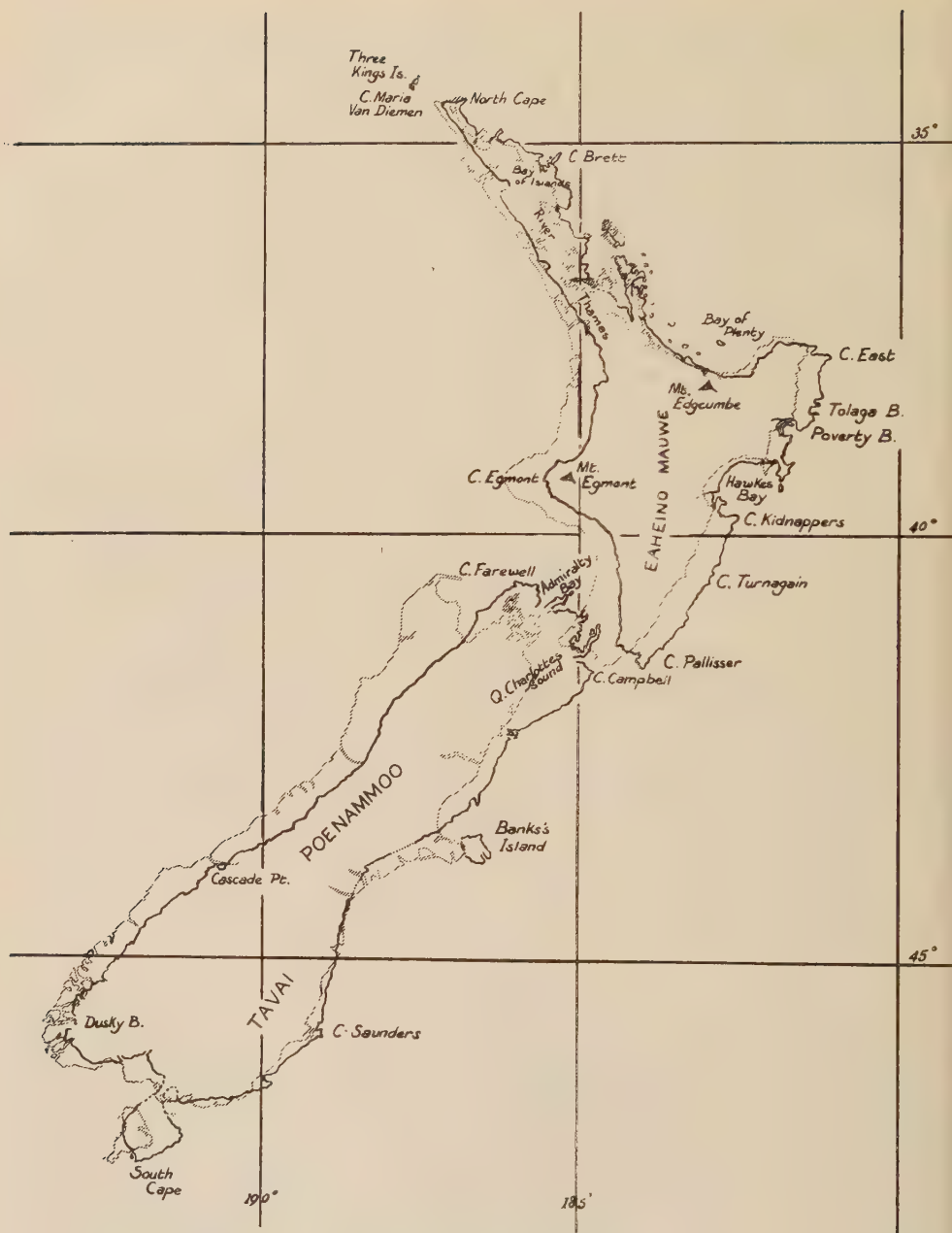


Fig. 3. New Zealand as charted by Cook (black line) and from modern surveys (grey line). (The two charts have been reduced to a common scale of latitude and the meridians superimposed.) Cook's outline is from the corrected Mercator chart published by Wales in 1788. This reveals Cook's accuracy in latitude and the correctness of his outline, with the general easterly error in longitude. For Cook's own criticism of his chart, see the Journals (Wharton, 1893, pp. 215-16; Cook, 1777, vol. II, p. 161).

and Mr William Bayly; and on the third, Bayly sailed in the *Discovery* and Cook and King made the observations in the *Resolution*.

Latitude, by meridian altitudes of the sun taken with quadrant or sextant, could generally be trusted. The latitude of the observatory at Point Venus, in Tahiti, as observed in 1773, differed by only 2'' (i.e. less than 70 yards) from that found in 1769, and by only 3'' from the correct figure (Pl. I, *b*).

Longitude was a much more uncertain factor, and Maskelyne remarked in 1763 that, by 'the common methods of keeping a reckoning. . . five, ten, or even fifteen degrees, are errors into which no one can be sure that he may not fall in the course of long voyages'. Although John Harrison's fourth chronometer had passed its tests at sea in 1764, Cook in the *Endeavour* had only what Lecky called 'that great natural chronometer presented by the moon in her orbital motion round the earth'. Longitude was determined by the method of 'lunar distances'. The moon's angular distance from the sun or a suitable star was observed; Greenwich time at the moment of observation was obtained from tables predicting the moon's motion and position in relation to other heavenly bodies; and comparison with the local time gave the observer his longitude. For the tables which Maskelyne published in *The British Mariner's Guide* (1763) he claimed an accuracy of 1° after calculations which (in Gould's estimate) would have taken 'some four hours', and in 1767 he produced the first edition of *The Nautical Almanac*, with tables of lunar distances for every three hours of Greenwich time, calculated for 1768. For the first time the seaman could make his observations for longitude rapidly and in sufficient numbers to reduce, by 'meaning', the errors of individual observers and instruments. 'By these tables [Cook wrote in 1773] the Calculations are rendered short beyond conception and easy to the meanest capacity and can never be enough recommended to the attention of all Sea officers, who now have no cause left for not making themselves acquainted with this. . . part of their Duty'.¹

There is no evidence that, apart from his observation of a solar eclipse in 1766, Cook made any determinations of longitude before 1768. It would be surprising if he had. In Newfoundland he had no *Nautical Almanac*, nor is it certain that he had a sextant. No observations of longitude are recorded in the *Grenville* log, except those on her annual voyages to and from England, taken by dead reckoning from her starting-point; and Cook's Newfoundland charts are graduated in latitude but not in longitude.

¹ From his experience in the *Resolution*, Wales found that the *Nautical Almanac* and new methods of correcting for parallax and refraction enabled the computations to 'be performed in 15 or 16 minutes by a very moderate computer; although formerly it could not have been done in less than three or four hours by the most skilful' (*Original Astronomical Observations* (1777), p. xliii).

No doubt Cook and his officers in the *Endeavour* learnt much from Green, at whose instruction (according to his Journal) 'several of the Petty Officers can make and calculate these observations almost as well as himself'; and after the second voyage the astronomer Wales wrote '...there were few, even of the Petty Officers, who could not observe the Distance of the Moon from the Sun, or a Star, the most delicate of all observations, with sufficient accuracy'.¹ Lunars were usually taken simultaneously by the astronomer, the captain, one of the lieutenants, the master, and a master's mate; and Cook claimed that he seldom found 'any material difference between the observations made by Mr. Wales, and those made by the officers at the same time'.

In the *Resolution* Cook carried a famous chronometer, that made to Harrison's design by Larcum Kendall, but he was no less assiduous in taking lunars. The number of such observations made in his Pacific voyages was remarkable. Along the Australian coast in 1770 (Cook says) 'we seldom faild of geting an Observation every day to correct our Latitude by, and the Observation[s] for Settling the Longitude were no less numerous and made as often as the Sun and Moon came into play'. On 17 August 1770, while the *Endeavour* was being driven towards the reef, 'not above 80 or 100 yards from the breakers...so that between us and destruction was only...the breadth of one wave', lunars were being taken by Green, Clerke (master's mate) and Forwood (the gunner); and Green coolly recorded that 'these observations were very good, the limbs of sun and moon very distinct, and a good horizon... We expected the ship to strike every minute'.² At two stations in the New Hebrides in August 1773, Wales made seventy-seven sets of observations, 'each set...consisting of between six and ten observed distances'. At Tongataboo in July 1777, 131 sets of lunars were taken, 'amounting to above a thousand observed distances'; and 137 sets in Nootka Sound in April 1778.

The observations in the *Resolution* were made 'chiefly with a view of determining how far a number of lunar observations might be depended upon'. In 63° S., in January 1773, twelve distances 'with the Telescopes fitted to our Quad^{ts}...agreed nearly with the Watch', and in the New Hebrides observations 'the longitude...as pointed out by the watch and by the observations, did not differ two miles'. Cook commented that 'this...shows what degree of accuracy these observations are capable of, when multiplied to a considerable number, made with different instruments, and with the sun and stars on both sides of the moon'; and he concluded

¹ Quoted in Introduction to Cook and King, *A Voyage to the Pacific Ocean* (1784), vol. 1, p. lxiii.

² Green's journal is in the P.R.O., Adm. 4545/151.

that by this method 'we are sure of finding a ships place at sea to a Degree and a half and generally to less than half a Degree'.¹ ($\frac{1}{2}^{\circ}$ of error in longitude would be produced by no more than 1' of error in the observed lunar distance.) Cook's own longitudes were in fact generally much better than this, that of Point Venus for instance being ascertained in 1769 with an error of only 1' (roughly a mile). Admiral Wharton, who attributes more error to the tables than to the observations, remarked that 'the astonishing thing is not that some longitudes [on the first voyage] are considerably in error but that the majority of them are so near the truth'.²

Cook wasted no opportunities for fixing his longitude by observing eclipses of the sun and moon, the transit of fixed stars, and other predictable phenomena. The longitude of Endeavour Bay in New Holland was determined with an error of only $2\frac{1}{2}'$ by observation of an emersion of Jupiter's first satellite.

OTHER OBSERVATIONS

The variety and fullness of the hydrographic and meteorological records in Cook's journals and in those of the astronomers is very striking. Variation and dip were regularly observed; and Wales claimed that 'the Method of making and computing observations for finding the Variation of the Compass is better known, and more frequently practised by those who have been on these Voyages, than by most others'. Tide tables were drawn up for many places; currents were constantly recorded by collation of the dead reckoning and the observed position, and notes on local wind systems were compiled. From pendulum observations at Tahiti comparison of the earth's gravity there and at Greenwich was made; the temperature and salinity of sea water was measured; Wales improvised an instrument for measuring the roll of the ship. And Cook invariably wrote out in his Journal careful sailing directions to supplement his charts.

METHODS OF SURVEY

On Cook's methods of survey the *Endeavour* and *Resolution* journals give very little explicit information, and among the surviving charts there are practically no roughs or early drafts which would furnish evidence of their construction. When possible (e.g. in Queen Charlotte Sound) his plans of harbours were plainly, as in Newfoundland, made from triangulation; others were sketches 'delineated with as much accuracy as the short time

¹ Wales, after the second voyage, considered that longitude could be determined by lunar distances 'within about one-sixth part of a degree, or at most, the one-fifth' (*Original Astronomical Observations* (1777), p. xlix).

² *Captain Cook's Journal during his First Voyage round the World... Edited by Captain W. J. L. Wharton, Hydrographer of the Admiralty* (1893), p. xxviii.

and other circumstances would allow', and in the Bay of Islands Cook writes, 'I have made no accurate survey of this Bay, the time it would have required...discouraged me from attempting of it'. The intervening coasts were charted on a continuous running survey from the ship, with frequent compass bearings or sextant angles taken on prominent shore features. In circumnavigating New Zealand Cook estimated his 'distance run' from the chart he was making and not by the log. His track was plotted by fixing the ship's position from his courses and from intersecting rays on landmarks, and adjusted from time to time to the astronomical observations. From sighting land on 7 October 1769 to sailing for New Holland on 31 March 1770 the daily 'Distance sailed' was not entered in the *Endeavour's* log book. Wales, analysing the records of the voyage in 1788,¹ tells us that Cook 'determined the ship's place from time to time by means of a series of triangles, which he carried on all round the island, and which formed a continued connection of the situations of the ship with remarkable objects inland, and the principal points of the coast; and he made no farther use of the log than to connect those points of the track which the ship was in when he took his angles and bearings'. In other words, Cook was using very much the technique of a land traveller making a compass route traverse. It has been conjectured that he measured distances 'by gun-shot (pendulum-timed) or by subtending masts';² this was contemporary practice, but there is no evidence of it in his Journals.

Many entries in the Journals show that Cook and his master spent a good deal of time at the masthead, and there are innumerable references to his ascent of coastal hills 'to take a view of the country', to 'set the different points &c.', or to take 'the necessary bearings'. The instrument which he carried ashore (certainly not the heavy theodolite) is named in only one entry. On 30 May 1770, in Shoalwater Bay (New Holland) Cook got 'upon a pritty high hill...in order to take a view of the Sea coast and Islands &c^a. that lay off it, and to take their bearings having the Azimuth compass with me for that purpose'. He found, however, that 'the needle...differed from its true posiseion...even above 30°...owing to Iron ore in the hill', and the general unreliability of these compasses may explain why, to the instruments supplied for his last voyage, Cook added as an afterthought two 'small Hadley's sextants of 5 inches radius by Ramsden'. We may recall Dalrymple's recommendation of the quadrant for 'taking Angles from... Hills, or a Ship's Masthead...almost the only way of exactly describing the Extent and Figure of Shoals'.

¹ Wales, *Astronomical Observations, made in the Voyages... successively performed by Commodore Byron, Captain Wallis, Captain Carteret, and Captain Cook* (1788), p. 108.

² H.D., *Summary of Selected Manuscript Documents* (1950), p. 41.

Cook's Journals repeatedly testify to his flair for predicting the trend of a coastline and for discerning and interpreting its principal features. This faculty was allied to that instinctive foreknowledge of the proximity of land which impressed his crew. Zimmermann, a seaman in the *Resolution*, tells us that 'when no one else had a suspicion of danger he often came up on deck and changed the course of the ship because land was near... Such occasions were frequent when he alone was sensible of the existence of land; and he was always right.'¹ We can point to only three major mistakes in his charting which he did not himself detect—the delineation of Banks Peninsula (in the South Island of New Zealand) as an island, and of Stewart Island as a peninsula, and the failure to determine the insular character of Tasmania.² Each of these mistakes illustrates the explorer's difficulty in distinguishing between a strait and a gulf or deep bay when he cannot keep the coast aboard or is afraid of a lee shore. Some of Cook's Pacific surveys had not been superseded by the end of the nineteenth century, and Admiral Wharton was prepared to uphold the authority of Cook's charting in the New Hebrides against amendments reported in his own day to the Hydrographic Department.³

But Cook was himself the most exacting critic of his own charts, and his remarks on their reliability exemplify his advice to the seaman to be 'so modest as to say such and such parts or the whole of his Plan is defective'. There is no better instance of this than his frank appraisal of his New Zealand chart. No less acute is his analysis of the older charts and journals with which he was well provided, and of the problems in geography and navigation which they left unanswered.

Some of the survey and much of the plotting, particularly in the *Resolution*, was delegated by Cook to his officers. The preamble to the Journal of his last voyage contains this passage: 'I had several young men amongst my sea-officers who, under my direction, could be usefully employed in constructing charts, in taking views of the coasts... and in drawing plans of the bays and harbours in which we should anchor'.⁴ We find some instances of this in the Journals. In Endeavour Bay on 30 June 1770 he 'sent some

¹ Zimmermann's *Account of the Third Voyage of Captain Cook* (Alexander Turnbull Library, 1926), p. 41.

² In March 1773 Furneaux recorded his opinion 'that there is no straits between New Holland and Van Diemen's Land, but a very deep bay'. Cook's acquiescence in this error without further investigation in 1777 is the more surprising in view of the recorded scepticism of Bayly, the *Adventure's* astronomer, and members of her crew. Mr G. B. Stigant has drawn my attention to a chart by Peter Fanin, master of the *Adventure*, in which Tasmania is plainly represented as an island (Admiralty Library).

³ Wharton, *Captain Cook's Journal* (1893), p. xxxviii.

⁴ I have not found this passage in the MSS. It may be an addition by Captain King or by the editor of the printed narrative, Canon Douglas.

of the young gentlemen to take a Plan of the Harbour'; in December 1774 Lieutenants Clerke and Pickersgill chart Christmas Sound, to the west of Cape Horn; in December 1776 William Bligh (master of the *Resolution*) surveys a harbour in Kerguelen Island; and in January 1777 Henry Roberts (master's mate) charts Adventure Bay in Tasmania. The charts of the second voyage, Cook told the Admiralty, were 'constructed partly from my own observations and partly from Mr. Gilbert's my master.... The Views etc. are all by Mr. Hodges' (the official artist).¹ Bligh, writing to Charles Burney in 1791, stated that, on the third voyage, 'the Parts of America from our first making the coast to the time of C. Cook's death was surveyed by himself', but Bligh claimed that he was responsible for the survey of the Friendly Islands and for all surveys made after Cook's death, including those of the Sandwich Islands and of the Asiatic coast south of Behring Strait.²

SURVIVING ORIGINAL CHARTS

Many of the original charts of the voyages have obviously been lost, as we can see from the comparative poverty of the two repositories—the Hydrographic Department and the Admiralty papers in the Public Record Office—where we might expect to find them. The Hydrographic Department, which possesses no original charts drawn by Cook himself in the Pacific, has, from the first voyage, two draughts by Robert Molyneux (master of the *Endeavour*) and twenty-seven by Richard Pickersgill (master's mate); from the second, only a general chart signed by Gilbert, with decorations drawn by Hodges; and, from the third, a dozen originals by Bligh, Edward Riou (midshipman in the *Discovery*) and Roberts.³

Cook plainly lost no time in plotting the charts from his surveys and observations. The entries in his Journals, which he apparently wrote up at intervals of a week or a fortnight, show that the charts to which they often refer had already been drawn, and copies of them were attached to the journals which he forwarded to the Admiralty. The fate of these charts illustrates the hazards to which such documents were subject in the eighteenth century. The journal, with charts of New Zealand, New Holland and the South Sea, which he sent back from Batavia in October 1770, was appropriated by Philip Stephens, Secretary of the Admiralty, and is now in Australia.⁴ The complete journal delivered to the Admiralty on Cook's

1 An admirable appreciation of Hodges's topographical work on Cook's voyages is given by Bernard Smith, 'European Vision and the South Pacific' (*Journal of the Warburg and Courtauld Institutes*, Vol. XIII (1950), pp. 65–100).

2 Bligh's letter is printed by G. Mackaness, *Life of Bligh* (1931), pp. 24–5.

3 H.D., *Summary of Selected Manuscript Documents* (1950), pp. 26, 43–45.

4 Known as the 'Corner MS.', this is the copy, in a clerk's hand, printed by Wharton in 1893. It is now in the Mitchell Library, Sydney. Its original charts are lost.

return in July 1771 is safely in the Public Record Office (after being missing from the Admiralty for a number of years in the nineteenth century), but it has lost its annexed charts.¹ The British Museum has a set of twenty-six charts, with some views, drawn by Cook in the *Endeavour*.² These were the originals supplied to the engravers of the plates in Hawkesworth's printed narrative of the voyage. The history of this collection before 1827 is unknown; it may be the missing Admiralty set, but looks more like a set of fair copies made by Cook for a friend or patron. Sir Joseph Banks had a dozen original charts by Cook from this voyage, with a few by Molyneux and Pickersgill, and these are also now in the British Museum.³

The Admiralty journal of the second voyage, in the Public Record Office,⁴ is still accompanied by its original charts, and another set came to the British Museum⁵ from the library of the Duke of Sussex, the illegitimate son of George III. None of these is signed, but the charts were presumably drawn by Gilbert or Cook and the views by Hodges.

Neither Cook's holograph journal of the last voyage (in the British Museum) nor the Admiralty copy (in the Public Record Office)⁶ has any charts. From this voyage I know only one surviving chart in Cook's hand—that which he sent home from Unalaska in October 1778⁷—and the originals by Bligh, Roberts and Riou in the Hydrographic Department. In the printed narrative of the voyage the charts are stated to be 'from the original drawings made by Lieut. Henry Roberts, under the Direction of Captain Cook'. In an angry marginal note scribbled on his copy of this work, Bligh commented that 'none of the Maps and Charts in this publication are from the original drawings of Lieut. Henry Roberts, he did no more than copy the original ones from Captain Cook who besides myself was the only person that surveyed and laid the Coast down, in the Resolution... Wm. Bligh'.⁸ Roberts's draughts, which have disappeared, were then fair copies for the engraver; but he claims that his large Mercator chart of the World was laid down on the voyage under Cook's eye.⁹ If we compare an original

¹ P.R.O., Adm. 55/40.

² Brit. Mus., Add. MS. 7085. The list of contents has pencilled notes for the engraver. The MS. was purchased from a Mr Bulgin (a printseller of Temple Bar) in January 1827.

³ Brit. Mus., Add. MSS. 11,803 and 21,593.

⁴ P.R.O., Adm. 55/108. The larger charts are now separately placed at M.P.I. 85-94.

⁵ Brit. Mus., Add. MS. 15,500. The charts in this unsigned volume seem to be copies by Hodges, for they are from the same hand as the views, which are unmistakably by Hodges.

⁶ Brit. Mus., MS. Eg. 2177A; P.R.O., Adm. 55/111-113.

⁷ Attached to Cook's letter to Stephens despatched 20 October 1778, received 6 March 1780 (P.R.O., Adm. 1/1612).

⁸ Bligh's notes on his copy (now in the Admiralty Library) were first printed by Lieut.-Commander R. T. Gould in *M.M.*, Vol. xiv (1928), pp. 371-85.

⁹ Cook and King, *A Voyage to the Pacific Ocean* (1784), Vol. 1, p. lxxix, note. Roberts's MS journal, in the Dixon Library, Sydney, contains five charts by him.

chart by Molyneux or Pickersgill with one by Gilbert or Bligh or Riou, the improvement in workmanship is very marked. It is evident that for the later voyages Cook took pains in the choice of his officers and in their training in chartwork. Gilbert, 'on whose judgment (Cook wrote) I had a good opinion', had previously, as master of the *Pearl*, been employed by Palliser on surveys of the Labrador and Newfoundland coasts after Cook finished his work in those waters.

Between the charts of Cook's Newfoundland service and those drawn by him and his officers after 1768, we can see many differences. The latter are commonly graduated both in latitude and in longitude. Unlike Wallis and his other predecessors, Cook carried his longitude from Greenwich and not from London; and the *Endeavour* was the first ship employed on discovery in which the prime meridian of Greenwich was adopted, no doubt because of the use made of the *Nautical Almanac* tables. The meridians are true not magnetic, and the charts give the variation wherever it was observed. The ship's track is laid down, with her noon positions. The projections of the larger charts were carefully chosen. For charts of the *Endeavour's* voyage across the Pacific, of New Zealand, and of the east coast of New Holland, the Mercator projection was used; in the general chart of the second voyage, Cook adopted a polar zenithal projection; and the charts of north-west America were drawn on a conical projection.

PLACE-NAMES IN COOK'S CHARTS

In naming his discoveries Cook anticipated modern practice. Unlike his predecessors, he diligently attempted to ascertain the place-names used by the natives and to put them on his charts. Tupia, the Tahitian whom Cook had on board the *Endeavour*, helped with names in Polynesia and New Zealand, and drew a chart of all the Polynesian islands known to him;¹ Omai, the Society Islander picked up in 1773 and returned to his home in 1777, proved less useful as an interpreter. Banks, in the *Endeavour*, and William Anderson, surgeon of the *Resolution* on the later voyages, showed exceptional facility in picking up native languages. On the second voyage Anderson compiled vocabularies of eight different dialects, and, on the third, of five; in the Friendly Islands in 1777 'above 150 islands were reckoned up by the natives; and Mr. Anderson . . . procured all their names'. The principal difficulties were phonetic and political. They were greatest in Melanesia and New Holland, where the Polynesian roots did not help and

¹ A copy of Tupia's chart, apparently drawn by Cook, is in the British Museum (*ex* Banks), Add. MS. 21,593c. The list of names of islands copied from this chart into Cook's Journal is described by Wharton (p. 230) as 'hopeless', only the names of the Society Group and islands immediately to the north being identifiable.

the inhabitants were often hostile. Cook frequently referred to 'the want of rightly knowing how to pronounce the names of the islands'; at Espiritu Santo (New Hebrides) in August 1774 'we could not obtain from the natives the Name of the Island'; and in New Caledonia all Cook's efforts 'to get the name of the whole island proved ineffectual. Probably it is too large for them to know by one name'.

Names given by Cook's forerunners, for instance Quiros in the New Hebrides and Mendaña in the Marquesas, were usually retained, to avoid confusion. Otherwise single islands and minor features received their native names, where they could be discovered. On arrival in Nootka Sound in March 1778, Cook 'honour'd it with the name of King George's Sound, but I afterward found that it is called Nootka by the natives'; and both names stand in his charts. For island groups of the Pacific he found that the natives, because of their political divisions and the great area of the archipelagos, often had no distinctive names, and he considered himself free to give English ones. In August 1774, after completing his survey of the New Hebrides, which Bougainville had called the 'Grandes Cyclades', Cook claimed that, as he had determined 'the extent and situation of these islands... added... several new ones... and explored the whole, I think we have obtained a right to name them'.

EPILOGUE

The portrait by Nathaniel Dance (Pl. II), for which Cook sat in May 1776, shows him at the peak of his career. He had just been elected a Fellow of the Royal Society and—an honour which he perhaps specially prized—he had at his own request been admitted a Younger Brother of Trinity House. In this portrait we see the man who, although habitually sober in statement, wrote of himself as one 'whose ambition leads me not only farther than any man has been before me, but as far as I think it possible for man to go. . . .'

The artist, by including a chart of the second voyage, suggests the hydrographer as well as the discoverer. Cook's description of many new coasts enabled seamen to navigate them safely and with confidence. But his charts and sailing directions are now superseded and his fame rests on a more durable foundation.

In the evolution of English marine survey Cook occupies a position not unlike that of General Roy in the history of the trigonometrical survey of this country. Roy's work was done before the creation of the Ordnance Survey, Cook's before that of the Hydrographic Department of the Admiralty. The standards of precision and scientific method set by the two men, one in land survey the other in hydrography, dominated the early labours of these regular establishments.

SOME CHRONICLES OF THE LARKINS FAMILY

THE CONVICT SHIP, 1792

By *E. W. Bovill, F.S.A.*

ONE of the most unpleasant duties on which East Indiamen were ever employed was the transportation of convicts. Early in 1792 Thomas Larkins was informed that on her next voyage the *Royal Admiral*, of which he was managing owner, would be destined for Botany Bay, whence she would proceed to Canton to load tea. The Company was possibly acting under Government instructions and may not have had any other suitable ship available. Whatever the circumstances, Larkins had to acquiesce, but he persuaded the Directors to grant him the right to load tea at Canton in preference to any other Indiamen provided he arrived there by an agreed date. This concession, whatever its value, can have been small consolation for the detestable duty which the *Royal Admiral* was required to perform, a duty which must have been even more distasteful to her unfortunate commander, Captain E. H. Bond.

Later we shall turn to the log-book of the *Royal Admiral* in which are recorded the incidents of her voyage to Botany Bay, but before it can be properly understood it is necessary to know something of the circumstances then surrounding the employment of convict ships.

* * *

When the war of American independence brought to a sudden end the transportation of convicts to trans-Atlantic plantations, the British Government provided hulks and houses of correction to accommodate the ever growing number of prisoners sentenced to forced labour. This was found to be so costly that they decided to seek new lands in which to form convict settlements. When their hopes of finding somewhere suitable on the coast of Africa were disappointed they turned their thoughts to New South Wales, only recently discovered by Captain Cook whose very favourable account of the country left little doubt that it fulfilled all the necessary requirements.

Late in 1786 the Lords Commissioners of the Admiralty advertised for ships to be 'taken up' for the conveyance of convicts to Botany Bay. In the following year they sent out an expedition of six transports and three store

ships to found the first settlement there. In the transports were 757 convicts, of whom 192 were women, and about 200 marines together with such livestock and seeds in the store ships as appeared necessary for the establishment of an agricultural colony.

Before the expedition had been at sea very long the convicts in one transport conspired to seize the ship and sail her to America, but they were thwarted in time.

The peril in which the ship had been placed was attributed to the unreasonably humane conduct of the leader of the expedition. Captain A. Phillips, R.N., had 'directed that the irons with which most of the male convicts had hitherto been confined, should be taken off them generally, that they might have it more in their power to strip their cloaths off at night when they went to rest, be also more at ease during the day, and have the further advantage of being able to wash and keep themselves clean'.

On future voyages male convicts continued to be confined in irons and usually were allowed on deck only in very small parties thus greatly extending the hours they had to endure in the foetid atmosphere of the hold. Even private passengers travelling in the comparative luxury of an ordinary Indiaman found the atmosphere foul. Thomas Twining, for example, was 'exceedingly oppressed by a close suffocating air, and by an offensive smell, to which I know nothing comparable and can only designate it by its usual appellation—*the smell of the ship*'.

During the eight months the voyage occupied there were only thirty-two deaths among the thousand or so persons comprising the expedition. So low a figure surprised all who knew the depths of human misery to which prison life in England in those days reduced the convict. If he survived at all he often emerged from gaol broken in mind and body and in no condition to stand the rigours of a long voyage. But it would have surprised them still more had they seen the conditions under which the prisoners had had to pass eight weary months at sea. In the sad history of transportation deaths were not always kept to so low a figure.

From the time of the first settlement up till 1802 the transportation of convicts to Australia was either put out to contract with commercial firms or entrusted to the officers and crews of especially chartered merchant ships. One of the colony's early historians, J. H. Tuckey, did not overstate the case when he wrote that this led to 'abuses disgraceful to humanity'.

In June 1790, two and a half years after the foundation of the settlement, four convict ships arrived there—the *Lady Juliana*, *Surprise*, *Scarborough* and *Neptune*. They had been sent out under a contract entered into by the Government with the London merchant firm of Calvert, Camden & King, who were to receive £17. 7s. 6d. for every convict they embarked. 'This

sum', wrote David Collins, the secretary to Phillips, now the Governor of New South Wales, 'this sum being as well for their provisions as for their transportation, no interest for their preservation was created in the owners, and the dead were more profitable...than the living.' The following accounts of the numbers who died on board each ship were given by the masters:

	Men	Women	Children
On board <i>The Lady Juliana</i>	0	5	2
<i>The Surprise</i>	42	0	0
<i>The Scarborough</i> ¹	68	0	0
<i>The Neptune</i>	151	11	2
	261	16	4

The *Lady Juliana* had sailed with 222 women convicts and, her voyage having taken ten months to complete, her losses were perhaps not unreasonable. How many convicts the other ships carried is not recorded but the numbers cannot have been great enough to make their appalling losses in any sense excusable.

According to Collins, the deaths were all attributable

to confinement, and of the worst species, confinement in a small space and in irons, not put on singly, but many of them chained together. On board the *Scarborough* a plan had been formed to take the ship... This necessarily occasioned much future circumspection... on board the other ships, the masters, who had the entire direction of the prisoners, never suffered them to be at large on deck, and but few at a time were permitted there. This consequently gave birth to many diseases. It was said that on board the *Neptune* several had died in irons; and what added to the horror of such a circumstance was, that their deaths were concealed, for the purpose of sharing their allowance of provisions, until chance, and the offensiveness of a corpse, directed the surgeon, or some one who had authority in the ship, to the spot where it lay.

The slender resources of the little settlement were hard strained to afford relief to the hundreds of sick who were landed from these four ships.

Upwards of thirty tents were pitched in front of the hospital... all of which, as well as the adjacent huts, were filled with people, many of whom were labouring under the complicated diseases of scurvy and the dysentery, and others in the last stage of either of these terrible disorders, or yielding to the attacks of an infectious fever... several of these miserable people died in the boats as they were rowing on shore, or on the wharf as they were lifted out of the boats; both the living and the dead exhibited more horrid spectacles than had ever been witnessed in that country.

John White, the Surgeon-General of the settlement, who sailed with the original expedition, attributed much of the sickness on board to the dampness of the holds. 'I thought', he wrote, 'whitewashing with quick lime the parts of the ships where the convicts were confined, would be the means of correcting and preventing that unwholesome dampness which usually

¹ It is probable that both the *Surprise* and *Scarborough* were Indiamen.

appeared on the beams and sides of the ships, and was occasioned by the breath of the people.' His enquiries into the cause of much sickness in one ship led him to conclude 'that the illness complained of was wholly occasioned by the bilge water which had by some means or other risen to so great a height, that the panels of the cabin, and the buttons on the clothes of the officers were turned black, by the noxious effluvia'.

We hear comparatively little about the feelings of the unhappy convicts who managed to survive being treated in a manner which to-day if meted out to cattle would attract the severest censure. Those who sailed with the original expedition started 'in high spirits. Few complaints or lamentations were heard among them, and an ardent wish for the hour of departure seemed generally to prevail'. The women convicts were less philosophical than the men but their tears did not reflect contrition.

The weather was now so immoderately hot, [writes the Surgeon-General], that the female convicts, perfectly overcome by it, frequently fainted away; and these faintings generally terminated in fits. And yet, notwithstanding the enervating effects of the atmospheric heat, and the inconveniences they suffered from it, so predominant was the warmth of their constitutions, or the depravity of their hearts, that the hatches over the place where they were confined could not be suffered to lay off, during the night, without a promiscuous intercourse immediately taking place between them and the seamen and marines. In some other ships the desire of the women to be with the men was so uncontrollable, that neither shame. . . nor the fear of punishment, could deter them from making their way through the bulkheads to the apartments assigned the seamen.

* * * * *

The great numbers of convicts which the Government wished to transport to New South Wales and the need to keep the new settlement supplied with stores, livestock, seeds and all the other necessities which the settlers were not yet able to provide for themselves, required a great deal of shipping space. These circumstances and the great length of the voyage called for large ships which made it inevitable that the Government should seek to employ Indiamen, then the biggest merchant ships afloat. Of the nine ships of the original expedition at least two, the *Scarborough* and the *Lady Penrhyn*, were Indiamen, and one of the next of the Company's fleet to be so used was the *Royal Admiral*, whose log is probably the earliest log of a convict ship to survive. These ships were always referred to as Botany Bay ships, although the first expedition, finding its destination less suitable than had been expected, had established the settlement a few miles farther up the coast at Port Jackson on a better site than Botany Bay could offer. Port Jackson was therefore the *Royal Admiral*'s destination.

The following is the first entry in the ship's log, dated 8 April 1792: 'Haul'd out of Mr Barnard's lower dock and dropped alongside the Sheer Hulk.' A few days later, off Gravesend, the ship received bedding and

clothing for 350 convicts. Early in May she began to receive convicts on board. These totalled over 300, of whom a sixth were women. She also carried as a guard a draft of one sergeant and twenty privates for the newly formed New South Wales Corps, besides various craftsmen and a great quantity of stores for the settlement. How much room was left in the hold for the 300 odd convicts we do not know, but it was obviously most inadequate.

On 14 May 'Captain Bond came out with Mr Larkins and paid ship'. The paying of an Indiaman by her managing owner was a sure sign that she would sail the next day. To have paid the crew earlier would certainly have resulted in many seamen absconding.

Captain Bond, a very experienced seaman, soon began to take steps to preserve the health of the miserable beings crowded together beneath his hatches. 'Paid the prison with oil of tar' became a frequent entry in the log. John White had attributed the comparatively few losses on the first expedition to 'the frequent use of oil of tar. . . . This efficacious remedy wonderfully resists putrefaction, destroys vermin and insects of every kind; and is in itself both agreeable and wholesome.'

An even more frequent entry in the log, 'smoked the prison rooms', is explained by Watkin Tench, the chronicler of the voyage of another convict ship. 'Frequent explosions of gunpowder', he wrote, 'lighting fires between decks, and a liberal use of that admirable antiseptic, oil of tar, were the preventions we made use of against impure air.'

Whenever the weather permitted, which was on most days, the log recorded 'Soldiers under arms and all convicts upon deck'. Whether they were all allowed on deck together, and whether in irons or not, we have no means of telling. It is probable, however, that whatever the regulations they were tightened up after a month at sea. The reason for this was the discovery of a conspiracy for which nine convicts received a comparatively mild punishment of three dozen lashes each.

One cannot doubt that it was a conspiracy to seize the ship for this was a common experience on the voyages of convict ships. Some of these conspiracies may have existed only in the minds of the nervous officers and guards responsible for the convicts of whom they were sometimes frankly frightened, as they might well be of human beings treated no better than wild beasts. Tench, an officer of the Marines, describes how on his ship they adopted 'such a system of defence, as left us little to apprehend for our own security, in case a spirit of madness and desperation had hurried them on to attempt our destruction'.

That this form of conspiracy was so common is not surprising. At all periods the sea has provided a very convenient escape for the hard-pressed

criminal. Moreover, the crimps whom the Company employed to man its ships recruited the seamen from the lowest dregs of the population. In the eighteenth century seamen, and often the Honourable Company's seamen, formed a considerable section of the enormous criminal class. It is probable, therefore, that the prison rooms of convict ships frequently harboured men with sufficient knowledge of the sea to persuade their fellows that if the latter seized the ship they, the seamen-convicts, would sail her to a happy land beyond the reach of the law.

After Captain Bond had dealt successfully with the conspiracy the discipline of the convicts gave him very little trouble, though minor offences were common enough, especially thefts. For example, 'Punished G. Wood, convict', reads the log, 'with one dozen lashes for milking the cow in the night and stealing the milk'.

By the middle of July scurvy had begun to appear, besides dysentery and fever, and before long nearly sixty convicts were ill. The ship reached the Cape early in August with the loss of one convict from scurvy, but three more died after arrival. The rest of the sick were sent to hospital on shore, but in less than three weeks all were re-embarked except one who had escaped. The voyage was resumed the next day.

Three days after leaving the Cape one of the women convicts gave birth to a child, the first of four to be born during the voyage. Scurvy soon reappeared and the sick list rose to over fifty. The surgeon next reported a 'dangerous fever' among the convicts. Before the *Royal Admiral* reached Port Jackson on 7 October, the sick-list totalled 69. In the course of an unusually fast voyage eight convicts, including one woman, had died.

The estimate of the success with which Captain Bond had discharged his duty can be left to Collins who recorded the ship's arrival at Port Jackson.

The *Royal Admiral* East Indiaman [he wrote], anchored in the cove. . . . Her passage from the Cape of Good Hope was the most rapid that had ever been made, being only five weeks and three days from port to port. . . . She brought in with her a fever, which had been much abated by the extreme attention paid by Captain Bond and his Officers to cleanliness, that great preservative of health on board ships, and to providing those who were ill with comforts and necessities beyond what were allowed for their use during the passage.

It is a record which reflects well on managing owner and commander alike. Thomas Larkins had made sure that anyway in his ship convicts should find more generous provision than a parsimonious and pitiless government permitted. This, and his commander's care for the well-being of the convicts, together with the sailing qualities of the *Royal Admiral*, had resulted in a voyage which instead of being a disgrace to humanity did credit to all directly concerned.

Besides stores and provisions for the colony, the *Royal Admiral* brought 'a person to be employed in the cultivation of the country; another as a master miller; and a third as master carpenter'.

One of the principal reasons for the unpopularity of serving in Indiamen engaged on extraordinary duties, such as trooping and naval services, was the financial loss to the officers and crew. They were denied the great advantages attaching to that much valued privilege, the Indulgence of Private Trade, but received no increase in their miserable rates of pay which were based on the assumption that they would be generously augmented by the fruits of private trade. The use of a ship for the transportation of convicts does not appear to have been wholly open to this objection.

'Of the private trade speculations taken out in that ship (*Royal Admiral*)', Collins relates, 'they sold the amount of £3,600 and left articles to be disposed of to the amount of £750 more.' With the reasonable assurance of a profitable homeward voyage from Canton the officers and crew probably did fairly well, but certainly not well enough to compensate for the hateful service on which they had been employed.

Shops were especially opened for the sale of private trade goods brought out in the *Royal Admiral*, but with unfortunate consequences. 'A licence was given for the sale of porter, but, under cover of this, spirits found their way among the people, and much intoxication was the consequence. Several of the settlers . . . conducted themselves with the greatest impropriety . . . rioting and drunkenness prevailed as long as the means remained.'

The stores sent out by the niggardly home government were no better than one might expect. The edible oil was rancid and could only be used for burning in replacement of candles. The convicts received an issue of clothing which fell far short of their pressing needs. The frocks and trousers given to the men mostly wore out within three weeks. The women each got 'one cloth petticoat, one coarse shift, one pair of shoes, one pair of yarn stockings; one hat; one pound of soap; a quarter of a pound of thread, two ounces of pins; six needles; one thimble, and one pair of scissors'.

The *Royal Admiral* sailed for Canton on 13 November 1792. The voyage was not wholly uneventful. On 15 December they saw two islands never before reported. 'Finding we could not weather them', reads the log, 'bore up and passed them to the eastward at about 6 miles distance.' In a note at the end of the log book they are described as 'both very low and covered with trees amongst which the cocoa nut tree was very conspicuous'. They appeared to be joined by a reef and Captain Bond named them Baring Isle after Sir Francis Baring the company's chairman, and the founder of the great house of Baring Brothers & Co. Captain Bond gave their position, a little inaccurately, as 5° 35' N., 168° 13' E.

The following day, at 11 p.m. the look-out saw a light on the lee-bow and later saw some twenty small islands, 'well covered with trees and full of inhabitants'. 'We are no doubt', reads Captain Bond's note in the log book, 'the first discoverers. I have named them the Muskitto Group.' Their position he gave as $7^{\circ} 20''$ to $7^{\circ} 47''$ N., $168^{\circ} 23''$ E.

Both claims were sustained, but in our maps the names given to these islands by their discoverers are being replaced by their native names.

GREAT BRITAIN AND MALTA BEFORE 1798

By *M. S. Anderson*

FROM the moment of its occupation by British troops in 1800, indeed from that of its conquest by France two years earlier, Malta has played a leading role in British imperial strategy and naval organization. It is thus surprising at first sight that until the middle decades of the eighteenth century remarkably little attention was paid to the island in political or naval circles in Britain, that its strategic potentialities, though not unknown, were largely ignored, and that the interest aroused by events there was intermittent and half-hearted. A little consideration, however, will dispel this surprise. Sustained interest in the Mediterranean as a field of naval activity was slow to develop in England in the seventeenth century, in spite of occasional spectacular exploits there by commanders such as Mansell, Blake, and Prince Rupert. The abandonment of Tangier in 1684 was made possible partly by this lack of interest,¹ and not until 1694 did an English fleet conduct a sustained naval campaign on a really large scale in the Mediterranean.² The idea of a canal through the isthmus of Suez had already been put forward, above all in France,³ but until the development of her routes to India via the Near East, which began seriously only in the last years of the eighteenth century, the eastern Mediterranean was to Britain a strategic dead end rather than part of a great imperial highway. Moreover, trade with the Levant, though growing in importance in the later seventeenth century,⁴ never had the national significance of that with the West Indies and North America, or the glamour of that with the East Indies. Trade with Malta itself was of course quite negligible. English indifference, before the eighteenth century, to the island and to the Order of St John of Jerusalem who had held it since 1530 (nominally as a fief of the kingdom of the Two Sicilies) is thus easily understood.

Some contacts between England and Malta did exist in the seventeenth century. The continual activity of Maltese privateers, and in particular their interference with shipping using the ports of Turkey and the Barbary States (with which the Order claimed to be permanently at war) gave rise

¹ E. M. G. Routh, *Tangier, England's lost Atlantic outpost, 1661-1684* (London, 1912), p. 269.

² Sir J. Corbett, *England in the Mediterranean, 1603-1714* (London, 1904), Vol. II, pp. 430-8.

³ F. Charles-Roux, *Les Origines de l'Expédition d'Égypte* (Paris, 1910), pp. 19-21.

⁴ A. C. Wood, *A History of the Levant Company* (Oxford, 1935), Chap. VII *passim*.

to a constant trickle of intricate and protracted disputes, many of which were never satisfactorily settled. In the 1660's, for example, the losses suffered in this way by the English consul in Cyprus, Roger Fowke, even led to a threat by Charles II to grant him letters of reprisal against Maltese shipping. It does not appear, however, that he ever received compensation.¹ In 1686 more serious difficulties arose when the Marquis de Fleury, a Piedmontese sailing under Polish colours (Poland being then at war with the Ottoman Empire) seized two English ships not far from Alexandria and took them to Malta. The ships had been chartered to carry Turkish passengers and goods from Constantinople to North Africa, and one of them had on board no less a personage than the Pasha of Tripoli.² The captured vessels were soon released, but the Pasha was forced to ransom himself, and to leave his wife and family in the island as pledges for the payment of the sum demanded.³ Also, the more valuable parts of the cargoes were not given up, much to the annoyance of the Pasha and his subordinates, who demanded ineffectively that the English government should take steps to secure their restitution.⁴ The contacts of the English navy with Malta in the seventeenth century were confined to visits paid to Valetta in 1675 and 1688 by squadrons under Sir John Narborough and the Duke of Grafton.

These however, were mere episodes. No continuous diplomatic relations existed between the two states (if the Order can legitimately be described as a state) and it is impossible, until well into the eighteenth century, to speak of an English policy towards Malta. There had been English consuls in the island since at least the early seventeenth century,⁵ but in their case the term 'English consul' was a misnomer, or at best a courtesy title. These officials were appointed by the Grand Master of the Order on his own initiative and for his own convenience, and were usually completely under his control. Many of them were not English, some could not even write

1 There is a good deal of correspondence on this affair in the State Papers Foreign, Malta, Vol. 1, in the Public Record Office. Volumes in this series will be cited hereafter by the designation of the class, S.P. 86, followed by the number of the volume.

2 See Fleury's long affidavit on the affair, of 16 November 1686, in S.P. 86/2, and the letter of the Grand Master, Gregory Caraffa, to James II, of 29 November, in S.P. 86/1. (All dates are new style.)

3 Consul Bataille to the Earl of Sunderland, 18 January 1687, S.P. 86/2.

4 See an undated protest (received in May 1687) of Ismail Bey and Ibrahim Dey of Tripoli, in State Papers Foreign, Barbary States, S.P. 71/22.

5 The first of them was William Watts or Watz, who died on 31 October 1610. A. Mifsud, *The Knights Hospitallers of the Venerable Tongue of England in Malta* (Valetta, 1916), p. 278. An English agent in Malta, John Lucas, is mentioned in a document of 1589 in the Genoese archives (F. Braudel, *La Méditerranée et le monde méditerranéen à l'époque de Philippe II* (Paris, 1949), p. 488), but he seems to have been little more than a spy, with no official standing.

English, and all corresponded with the Secretaries of State in London very intermittently and as a matter of convenience rather than of obligation. In the eighteenth century at least they normally held British vice-consular patents, issued to them by the consul at Messina to whom they were in theory subordinate. These documents however added nothing to their authority in Malta, and they were never appointed or in any real sense controlled from London.

In the first decades of the eighteenth century the position began to change. As the antagonism between Britain and France became more inveterate and deep-rooted, the British government was gradually driven to pay more attention to events in Malta by the disturbing fact that its great enemy was steadily and rapidly increasing her influence there, and threatening to transform the island into an advanced base and communications centre for the French navy. This threat Britain could not ignore. Her newly won position as a great Mediterranean power, as well as the need to safeguard her trade with Italy and the Levant, forbade such quiescence. In spite of all she could do, however, French influence in Malta, helped by the destruction in 1713 of Spain's former position of dominance in Italy, grew throughout the century.

On the eve of the revolution of 1789 it was supreme.¹ Three of the eight *Langues*, and six of the twenty-two priories into which the Order was divided and subdivided were French. These figures, however, do not reflect the growing numerical preponderance of Frenchmen among the knights, which by the end of the century had become overwhelming.² A particularly disturbing aspect of this preponderance from the British point of view was that a considerable proportion of the French knights were also officers in the French navy. Several of the greatest naval commanders France produced in the seventeenth and eighteenth centuries—the Marquis de Valbelle, the Comte de Tourville, the Bailli de Suffren—were members of the Order.³ France also provided the Order with a very substantial part of its revenues, and French cultural influence was dominant in Malta. The code of laws issued in 1782 by the Grand Master Emmanuel de Rohan-Polduc, himself a Frenchman, was based on Roman and French customary law rather than

¹ 'Malte, aux alentours de 1789 était, en réalité, une dépendance, une colonie de fait de la France', J. Godechot, 'La France et Malte au XVIII^eme siècle', *Revue Historique* (1951), Vol. ccvi, p. 67.

² At the time of the French attack in 1789 there were in the island 322 knights, commanders, and *baillis* of the Order able to bear arms. Of these 200 were French. See the anonymous *Révolutions de Malte en 1798; gouvernement, principes, loi, statuts de l'ordre* (1799). These figures are accepted by Miège in his *Histoire de Malte* (Paris, 1841), Vol. III, p. 34.

³ In 1790, 65 French naval officers, including a vice-admiral, four *chefs d'escadre*, and six captains, were knights. E. W. Schermerhorn, *Malta of the Knights* (London, 1929), p. 227.

on that of Malta and Sicily.¹ All this could hardly fail to be reflected in a tendency for the Order, although strictly neutral in theory, to adopt in practice an anti-British attitude in the great Anglo-French wars of 1740–8, 1756–63, and 1778–83. The geographical position of Malta moreover allowed it to become a factor of no small importance in protecting the trade and communications of France and hampering those of Britain.

The changing position in the island and its serious implications for Britain were not at once understood in London. During the war of the Spanish Succession British men-of-war and privateers, though they were usually refused admission to Valetta, were able to obtain food and other supplies in the small bays which indent the coasts of Malta, and the government seems to have been willing to accept this somewhat humiliating compromise.² A few years later, however, the brief Anglo-Spanish war of 1718–20 subjected relations between Britain and the Order to the most severe test they had hitherto undergone. The difficulties arose from the capture of a number of British merchantmen by privateers, ostensibly Spanish, but equipped at Malta, based on the island, and navigated by largely Maltese crews. After a number of futile complaints by letter, Admiral Byng, who commanded the Mediterranean squadron, sent his First Captain, George Saunders, in October 1719, with two men-of-war to Malta to demand compensation for the losses suffered in this way.³ In spite of the protests of the Knights, Saunders succeeded in obtaining a promise that the owners of ships and goods taken by the privateers in question should be compensated.⁴ To achieve this success he had to threaten a blockade of Valetta, and to agree that the Order should have the right to appeal to the King for a modification of the agreement.⁵

Feeling, with some justification, that the Knights had been harshly treated, the Grand Master Perellos took advantage of the concession, and sent to London to plead their case one of the ablest of them, Joseph de Laval.⁶ Although he had the powerful backing of the Duc d'Orléans,⁷ regent of France, Laval did not succeed in securing the nullification of the agreement with Saunders, but in 1723 the King of Spain, Philip V, offered

1 Godechot, *loc. cit.* p. 71.

2 Grand Master Raymond Perellos to Queen Anne, 31 March 1713, and Queen Anne to the Grand Master, 19 July 1713, in Mifsud, *op. cit.* pp. 259, n. 2; 260, n. 1.

3 Byng to Josiah Burchett (Secretary to the Admiralty), 24 October 1719, Public Record Office, Admirals Letters, Mediterranean, Adm. 1/377.

4 Five of the captured ships, then at Malta, were given up by their captors. See a printed memorial endorsed 'in ye Chevr. Laval's of ye 17 Mar. 1721', in S.P. 86/1.

5 Some account of Saunders' negotiations may be found in *Pattee Byng's Journal*, ed. J. L. Cranmer-Byng (Navy Records Society, 1950), Vol. LXXXVIII, pp. 180–90.

6 Perellos to George I, 17 January 1720, State Papers Foreign, Royal Letters, S.P. 102/36.

7 Orléans to George I, 17 May 1720, S.P. 102/36.

to accept liability for the compensation which the Order had agreed to pay, as the captures had been made under his flag.¹ This was accepted by the British government as a satisfactory settlement of its claims against the knights, which after 1724 were allowed to drop. The whole affair had been something of a storm in a teacup. A somewhat similar incident in May 1736, when a British ship was taken off the coast of Egypt by another Maltese cruiser under Spanish colours,² led to no comparable dispute.

By the late 1740's, nevertheless, serious friction between Britain and Malta was beginning to show itself for the first time, and was not to cease until after the end of the Seven Years War. It was caused not only by the growth of French influence in the island but also by the activities and personality of John Dodsworth, who had become British consul there in 1743. Dodsworth, who had married the daughter of his predecessor in the consulate, Alexander Young, was appointed in the normal way by the Grand Master, Emmanuel Pinto de Fonseca (1741-73). Within a few years, however, he conceived the ambition, which never afterwards left him, of becoming a genuine British consul, subject only to the ministry in London, and independent of any authority in Malta.

The possibility of establishing in the island a British consul of the normal type had in fact already been considered more than once. A proposal to this effect was discussed in 1713, and another which had the support of Admiral Byng appears to have been approved by the Privy Council in 1721.³ The extreme smallness of Britain's direct trade with Malta, the consequent indifference of most merchants to the position there, and the unwillingness of the government to increase its expenditure on consular salaries had so far prevented anything being done in the matter. For the same reasons Dodsworth's first proposal, made in 1747, that his position be strengthened and regularized in this way, was refused.⁴ Undeterred he returned to the charge in 1753, 1754, and 1756, suggesting to successive Secretaries of State not only that he be given full consular status but that his new patent be sent out to Malta in a man-of-war and that British warships should pay periodic visits to the island to show the flag and maintain British prestige there.⁵

1 Mifsud, *op. cit.* p. 263; Chevalier de Camilly to 'My lord' (Carteret?), 8 July 1724, S.P. 86/1.

2 Duke of Newcastle to Chamberlayne (consul at Messina), 4 October 1736, State Papers Foreign, Foreign Entry Books, Italian Consuls, S.P. 104/98.

3 *Journal of the Commissioners for Trade and Plantations* (London, 1920-38), under 7 and 14 December 1713; Consul Young to Newcastle, 14 July 1733, S.P. 86/1. It is perhaps noteworthy that both proposals came immediately after wars which had helped to emphasize the strategic importance of Malta.

4 *Journal of the Commissioners for Trade and Plantations*, under 31 August, 2, 7 and 22 November 1747.

5 Dodsworth to the Earl of Holderness, 18 April 1753, 16 March and 25 May 1754; to Sir Thomas Robinson, 10 September 1754, S.P. 86/2.

This readiness to make use of threats or implied threats becomes henceforth a noticeable feature of his correspondence and helps to explain his growing unpopularity with the Grand Master and the Order.¹ To all these proposals the government turned a deaf ear, but it was clear that Dodsworth's ambitions were not likely to help either Britain or the Order to surmount the difficulties which now threatened good relations between them.

The increasing partiality shown in Malta for the French remained the greatest of these. Not only were several valuable French convoys given shelter in Valetta during the war of the Austrian Succession, and thus saved from falling into the hands of the British, but men-of-war belonging to the Order were used to run the British blockade of Marseilles and Toulon, and to transport stores and money from Barcelona for the use of the Spanish army in southern Italy.² By January 1748 Admiral John Byng (son of the victor of Cape Passaro) then in command of the Mediterranean squadron, was threatening to seize Maltese ships in reprisal,³ and probably only the conclusion of peace at Aix-la-Chapelle in October averted a serious quarrel. On the other hand, the activities of British privateers, and particularly attacks by them on French ships in Maltese territorial waters, were giving the Grand Master grounds for complaints which were often justified, particularly as every French ship lost in this way stimulated further pressure from Paris upon the Order to assert and defend its neutrality.⁴ Some of the disputes of this kind which were now arising proved most difficult to settle. Thus the capture off Malta in April 1748, by Captain William Hutchinson⁵ of the privateer *St George*, of the French ship *St Jean*, gave birth to a series of legal complications which were not ended till late in 1751 when the ship, which had lain at anchor in Valetta harbour for over three years, was finally declared to be a good prize, and sold for a fraction of its original value.⁶

With the outbreak, in the last months of 1755, of what was virtually an undeclared war between Britain and France, friction of this kind was bound to increase. The seizure and bringing into Valetta by the French of a number of British ships, one of them taken in Sicilian territorial waters, and the

¹ Which he dismissed in one despatch as 'a handfull of Wretches here on a Rock'. To Pitt, 26 October 1758, S.P. 86/3.

² Archives du Ministère des Affaires Etrangères, Paris, Correspondance Politique Malte, Vol. 10, contains two unsigned mémoires of April 1750 which show how useful Malta was to the French in these ways. Hereafter volumes in this series are cited as Corr. Pol. Malte, followed by the number of the volume.

³ Byng to Thomas Corbett (Secretary of the Admiralty), 23 January 1748, Adm. 1/382.

⁴ Bailli de Tessé to the Duke of Bedford, 29 November 1748, S.P. 86/1.

⁵ Later dock-master at Liverpool and author of *A Treatise on Practical Seamanship* (Liverpool?, 1777).

⁶ Dodsworth to Bedford, endorsed 'supposed to be 12 October 1751', S.P. 86/2. The ship had already been condemned by the notoriously venal Vice-Admiralty court in Minorca.

sale in the island of two French prizes captured by Captain Augustus Hervey in H.M.S. *Phoenix* (24) raised tempers on both sides and made trouble even more certain.¹

Although the Grand Master, a Portuguese, would probably have liked to observe strict neutrality, he was powerless to resist the pro-French bias of the majority of his subordinates, which was soon to be unmistakably displayed. In the early months of 1756 three French privateers were allowed to arm and fit out at Valetta, while simultaneously the British ship *Lark* was refused permission to strengthen herself in any way, or even to ship ten or twelve men she needed to complete her crew. When her captain, Robert Miller, refused to disarm her, the ship's rudder was destroyed by two Maltese guard-boats to prevent her putting to sea, and a few days later he himself was arrested. In October the Order went still farther and seized the privateer *St George* (possibly the ship which had taken the *St Jean* in 1748) which with two prizes had put into Valetta. Her captain, the famous Fortunatus Wright,² was told that the shore batteries would sink his ship if he attempted to leave the harbour.³

Such incidents might in different circumstances have led to action as drastic as that of Byng in 1719, but a government already facing severe military difficulties and an increasingly hostile public opinion was in no mood to embroil itself with the Order, especially as the legality of Miller's actions was at least questionable. Pitt, on his accession to power in June 1757, was interested enough to have a memorandum on the position at Malta drawn up for him,⁴ but he had his hands much too full of more important business to do anything in the matter. By 1758, however, as Britain began to reassert her naval superiority in the Mediterranean, the fear that she might make a more forcible reply to these constant pin-pricks began to gain ground in Malta. In July of that year Captain Hervey, commanding in the *Monmouth* (64) a squadron of three men-of-war, gave point to the fears by destroying the French frigate *Rose* (36) within Maltese territorial waters. He followed this up by protesting so strongly against the pro-French bias shown by the Order that the alarmed Grand Master gave orders a few days later that only three or four British ships should in future be allowed to use

1 Dodsworth to Henry Fox, 31 December 1755, S.P. 86/2, and 27 March and 30 May 1756, S.P. 86/3.

2 On whom see J. K. Laughton, *Studies in Naval History* (London, 1887), Chap. vi. William Hutchinson was one of his lieutenants.

3 Dodsworth to Fox, 25 July, 3 and 6 August 1756, S.P. 86/3. For the Order's view of these incidents see a document entitled 'Substance of several Italian Papers given to Sir James Gray at Naples by the Maltese Ambassador' (1758) in S.P. 86/3, and the Grand Master's letter to George II of 25 August 1756 in S.P. 102/36.

4 It can be found in the Public Record Office in the Chatham Papers, Vol. 94, G.D. 8/94.

the harbour of Valetta simultaneously.¹ In June 1759, as the difficulties of the Order's position increased, sanitary precautions were made an excuse for the denial of pratique to both belligerents. Though French influence at Malta was as strong as ever,² the fact that the overpopulated island could feed its inhabitants for only five months in each year³ made it, in spite of the almost legendary strength of its fortifications, very vulnerable to blockade. Moreover, the garrison numbered only about 700 regular troops.⁴ Thus even the possibility of turning Britain into an active enemy could be viewed only with the greatest uneasiness. It is possible that the Order was also influenced by the quite mistaken belief that the British government hoped, by instigating a Turkish attack on Malta, to force Spain to divert some of her naval strength to the defence of the island, and thus delay or avert her entry into the Seven Years War.⁵

It was while matters were still in this tense and uncertain state that Dodsworth at last overreached himself. In order to be able to attack shipping belonging to Austria and Sweden, a small number of British privateers took out Prussian letters of marque late in 1759.⁶ Dodsworth helped and encouraged them, and it seems very probable that he had a financial interest in the venture. Early in 1760 one of these ships took a Tuscan vessel, the *Pina d'Oro*.⁷ By so doing she precipitated a minor crisis both in Berlin and Malta, for the captured ship had on board a considerable quantity of goods owned by Turkish subjects. For Frederick II of Prussia, under whose flag the capture had been made, this was not only exasperating but potentially disastrous. At a time when he was straining every nerve to bring Turkey into the Seven Years War as his ally, and thus reduce the almost unbearable pressure of Austria and Russia on his southern and eastern frontiers, a case of this kind, trivial in itself, could have the most serious repercussions upon a court and government so traditionally unstable as those of Turkey. He therefore found himself compelled not only to take what steps he could to

1 Hervey to Cleveland (Secretary of the Admiralty), 10 and 19 July 1758, Admiralty Papers, Captains Letters, Adm. 1/1893; Mifsud, *op. cit.* p. 274.

2 See, for example, the comments of Captain Hugh Palliser in his despatch of 12 August 1760 to Philip Stephens (Secretary of the Admiralty) in Adm. 1/2297.

3 P. Brydone, *A Tour through Sicily and Malta in a series of letters to William Beckford Esquire* (London, 1773), Vol. 1, p. 309.

4 Bailli de Combreaux to the Duc de Choiseul, 29 January 1759, Corr. Pol. Malte, 11.

5 Sir James Gray (Minister at Naples) to Pitt, 7 April 1760, State Papers Foreign, Naples, S.P. 93/19. The arrival at Malta in October 1760 of the Turkish man-of-war *Corona Ottomana* (70), carried off from the island of Kos by her own slaves, had intensified Turkish hostility to the Order. The ship was eventually bought by France and returned to Turkey as a gesture of friendship in the following year.

6 It will be remembered that Britain, the ally of Prussia in the Seven Years War, was at peace with Austria and Sweden, though they were at war with Prussia.

7 The Grand Duchy of Tuscany was of course an Austrian dependency.

prevent any repetition of the incident but also, in the spring of 1761, to compensate the Turkish merchants concerned for their losses, without waiting until the captured property (which had been deposited at Malta in warehouses owned by Dodsworth) could be recovered.¹

From the point of view of the knights too the position was irritating and even alarming. Frederick II had under his control in Silesia considerable estates belonging to the Order,² which he had already threatened to confiscate.³ This gave him an excellent means of putting pressure on the Grand Master to force Dodsworth to give up his ill-gotten gains, and he took full advantage of it.

Nevertheless, in spite of repeated urging Dodsworth stubbornly refused to give up the goods taken from the *Pina d'Oro* or account for those he had disposed of.⁴ Finally, in April 1762, his warehouses were broken open, and he himself was confined to his house. A month later he was summarily dismissed from the consulship by the Grand Master;⁵ his successor, Angel or Angelo Rutter, whose father, a native of London, had already acted as British consul, was not appointed until nearly a year had elapsed.

The Order showed itself distinctly uneasy lest, coupled with other grievances, this drastic action should provide an actively hostile reaction in Britain. One of the younger knights, Giorgio de Valperga de Massino, was thus sent on a special mission to London to explain and justify what had happened, while security precautions were intensified and the construction of two new 50-gun ships was begun.⁶ The fears which had inspired these precautions were however largely groundless. Valperga de Massino was well received in London, and George III, in an official letter to the Grand Master, expressed his disapproval of Dodsworth's conduct.⁷ Moreover, the ending of the Seven Years War by the treaty of Paris in February 1763 automatically removed the most serious sources of friction between Britain and the Order.

On the other hand, the appointment of Rutter two months later, without the slightest reference to the British government, and the Grand Master's action in handing over to him official correspondence which was not

1 Frederick II to Finckenstein (his chief minister), 25 February and 4 March 1760, *Politische Correspondenz Friedrichs des Grossen*, Vol. xix, pp. 132-3, 153; to Rexin (Prussian minister in Constantinople), 20 May 1761, *Ibid.* Vol. xx, p. 404.

2 P. M. L. de Boisgelin de Kerdu, *Ancient and Modern Malta* (London, 1804), Vol. 1, pp. 252-9.

3 Grand Master to Louis XV, 3 April 1748, Corr. Pol. Malte, 9.

4 Grey to the Earl of Egremont, 11 May 1762, S.P. 93/19.

5 Dodsworth to Egremont, 4 and 10 April, 5 May 1762, S.P. 86/3.

6 Grand Master to George III, 31 May 1762, S.P. 102/36; Mifsud, *op. cit.* p. 276.

7 The letter, of 7 January 1763, is in S.P. 102/36.

addressed to him, provoked a good deal of criticism in London. As a result Captain Thomas Harrison of H.M.S. *Centurion* was ordered in September 1763 to proceed to Malta, procure the release of Dodsworth (who had since February been a prisoner in the castle of St Elmo)¹ and if possible obtain the consent of the Grand Master to the appointment of a new consul by George III.² It appeared for a moment as though British relations with the Order were to be established on a new and more normal basis. Harrison paid two visits to Malta, in January 1764 and April 1765,³ but secured neither of his objectives. Dodsworth was not released until the summer of 1767, after more than five years imprisonment, when Frederick II had at last abandoned hope of recouping himself at the consul's expense for what he had had to pay the Turks.⁴ The Grand Master refused to replace Rutter by a genuinely British consul, or even to allow him to accept a British vice-consular patent. The government had never in fact meant to press this point if it encountered determined resistance,⁵ so the matter was quietly dropped, and Rutter remained undisturbed as British consul.

On this unsatisfactory note ended nearly two decades of quarrels. Disputes so complex and so potentially serious were not to arise again between Britain and the Order of St John. The virtual annihilation of British trade in the Mediterranean and the paucity even of British privateers there prevented their recurrence during the Anglo-French war of 1778–83, for the pro-French bias of one island in a sea dominated by France could hardly make much difference to Britain. Indeed the generation 1763–93 saw political contacts between Britain and Malta become almost as intermittent and unimportant as in the seventeenth century. Once more the island and its inhabitants ceased to seem of interest or significance to ministers in London. A new Anglo-Bavarian *Langue* of the Order was set up in 1782 with the consent of George III, but all the leading positions in it were held by Germans.⁶ Rutter corresponded with the British Secretaries of State only at long and irregular intervals, and never on matters of importance. His successor, William England, who was appointed by the Grand Master de Rohan-Polduc in 1787, failed completely to persuade the government

¹ His wife and daughter had been sent to 'a convent for penitent harlots'. Dodsworth to Egremont, 7 February 1763, S.P. 86/3.

² Lord Halifax to Captain Hervey, 2 September 1763, and Hervey's memoir to Harrison (undated, about 11 September) in S.P. 86/3.

³ The long interval was caused by other tasks which he had to perform, notably that of settling a dispute between the British consul at Algiers and the Dey. See *Calendar of Home Office Papers, 1760–1775* (London, 1878), nos. 1358, 1362, 1371, 1380.

⁴ Rutter to Lord Shelburne, 12 July 1767, S.P. 86/4.

⁵ Halifax to Harrison, 3 April 1764, S.P. 86/4.

⁶ Mifsud, *op. cit.* pp. 229–31.

to grant him a salary, and had to depend on a 'miserable allowance' of £4 a month from the Grand Master.¹ Meanwhile, a new and vital factor had been introduced into the situation by the growth of the power and ambitions of Russia. Catherine II attempted on more than one occasion to secure the help of the Order in the strengthening and development of Russia's galley fleets in the Baltic and the Black Sea.² More serious, she also attempted to use the island as a base of operations against the Turks, particularly in 1769-70 during the remarkable naval campaign which culminated in the annihilation of the Turkish fleet at Chesmé.³ In 1784 she forced the Grand Master to allow a Russian chargé d'affaires to reside in the island,⁴ and such was the fear she inspired that Rohan-Polduc on one occasion begged for the despatch of 1500 Neapolitan troops to protect Malta against a possible Russian *coup de main*.⁵ Yet there is no sign that the possibility of Russian dominance or possession of the island aroused much fear or even much interest in London. Not until the outbreak of war with France in 1793 did Malta once more begin to play any part in British political or strategic thinking.

The French Revolution of 1789 antagonized the Knights of St John not only by its attacks on Catholicism and monarchy, but even more by the confiscation of the great estates and properties of the Order in France, which was decreed by the Convention in September 1792. Nevertheless, conscious of their growing weakness, which had been revealed by a considerable revolt of their Maltese subjects in 1775, they clung as long as possible to their neutrality in the great series of wars which began in 1792. Even after the execution of Louis XVI in January 1793 a French chargé d'affaires representing the new republic continued to be recognized by the Grand Master.⁶ By the end of the year, however, the Order had been forced, largely by Neapolitan pressure, to become in effect a minor member of the anti-French coalition.⁷ This was followed by the unaccustomed spectacle of

1 England to the Duke of Leeds, 13 November 1790, Foreign Office Papers Malta, F.O. 49/2. The allowance was later increased to £7.

2 A. A. Alyab'ev, 'Snosheniya Rossii s Maltiskim Ordenom', *Sbornik Moskovskovo Glavnovo Arkhiva Ministerstva Inostrannykh Del'* (Moscow, 1893), Vol. v, pp. 185-6; Bulletin of news from Malta, of 30 July 1766, in Corr. Pol. Malte, 12.

3 See her letters to the Grand Master of 29 July and 6 October 1769 in *Sbornik Imperatorskovo Russkovo Istoricheskovo Obshchestva*, Vol. LXXXVII, pp. 454-5, 494-5.

4 Mifsud, *op. cit.* pp. 282-3; Godechot, *loc. cit.* p. 78.

5 Alyab'ev, *loc. cit.* p. 207.

6 The arguments in favour of neutrality, and the indecision and lack of leadership which prevailed in Malta, are well summed up in the documents quoted by P. J. L. O. Doublet in his *Mémoires historiques sur l'invasion et l'occupation de Malte par une armée Française en 1798* (Paris, 1883), pp. 337-43, 382-8, 409-23.

7 Miège, *op. cit.* Vol. II, pp. 325-7; England to Lord Grenville, 18 September 1793, F.O. 49/2.

British men-of-war and privateers making free use of Malta as a base, and by the recruitment with the help of the Grand Master of a considerable number of Maltese for service in the British forces.¹ The most noteworthy example of this was the raising at the end of 1793 of a force of about 1000 men to strengthen the weak and disunited allied force then holding Toulon. In January 1794 H.M.S. *Captain* and the armed ship *Aurora* sailed from Valetta with over 400 of these recruits, though in fact Toulon had fallen to superior numbers and Bonaparte's guns before they left the island.²

Even now Malta attracted comparatively little attention in London. There are some indications that the possibility of its becoming a British possession had occurred to a few far-sighted individuals,³ but it continued to be valued as much for the commercial advantages it might bring as for its strategic importance. Not till the summer of 1794, for example, was a British consular commission finally sent to Mr England.⁴ Nor was the pro-British attitude of the knights to be of very long duration. The virtual abandonment of the Mediterranean by the British fleet at the end of 1795, and the almost unbroken run of success enjoyed by the French armies, soon convinced the Grand Master that the increasingly impoverished and defenceless Order was in no position to resist the new republic. Already in 1795 an ambassador extraordinary, the Bailli d'Hanoville, had been sent to Paris, though the Directory refused to receive him. By the autumn of 1796 the Grand Master had recognized the tricolor flag, and French privateers were once more being allowed to sell their prizes in Valetta.⁵

Indeed it was now clear that the Order, the last of the great military-monastic organizations of the middle ages, was dying. Its death seemed to be symbolized by that of the Grand Master, Rohan-Polduc, in July 1797, after a reign of twenty-two years.⁶ Even the conclusion with the Tsar Paul I in January 1797 of a convention which set up a new Grand Priory of Russia was a mere gesture, and the offer to him a few months later of the title of Protector of the Order was, as has been said, 'le dernier acte d'une souveraineté expirante'.⁷ In the last months of its existence the Order

1 A series of decrees, issued by the Grand Master in December 1792–January 1793 to encourage recruiting in Malta for the British army and navy, can be found in Miège, *op. cit.* Vol. II, pp. 477–9.

2 England to Grenville, 18 January 1794, F.O. 49/2; J. H. Rose, *Lord Hood and the Defence of Toulon* (Cambridge, 1922), pp. 53, 161.

3 See, for example, the 'Memorandum respecting Malta' (undated, 1794?) in F.O. 49/2.

4 England to George Aust, 7 August 1794, F.O. 49/2.

5 England to Henry Dundas (Secretary of State for War), 5 September 1796, F.O. 49/2.

6 There was known to be a considerable republican party, sympathizing with the French Revolution, among the knights, and the military strength of the Order was very small. W. Hardman, *A History of Malta during the period of the French and British occupation, 1798–1815*, ed. J. H. Rose (London, 1909), pp. 7, 23–5.

7 Miège, *op. cit.* Vol. II, p. 347.

became more and more subservient to France. 'Here my Lord', reported England to Lord Grenville, 'they do nothing but preach their sacred Neutrality to us English, whilst on the other hand they grant to the French and Spaniards whatever they demand'. At least two British privateers, the *Hawk* and the *Ranger*, which put into Valetta in the early months of 1798, were seized and refused permission to put to sea again.¹ Indeed but for the capture of Malta by Napoleon the position there might have come to resemble closely that during the Seven Years War.

Events within the island after 1798, and the complex diplomatic disputes to which it gave rise, are outside the scope of this study. It must again be emphasized, however, that it was not until after the French occupation that Malta and its strategic possibilities began to attract the serious attention of British admirals and statesmen. Napoleon had well realized before he embarked on his Egyptian expedition how necessary possession of the island was to France if she were to dominate the Mediterranean.² By contrast, Nelson seems to have attached little significance to it until it was in French hands, though once convinced of its importance he strained every nerve to recover it for the allies.³ Only slowly was the great superiority of Valetta to Port Mahon as a base from which to blockade Toulon and harass enemy movements in Sicily and southern Italy realized.⁴ Indeed it may be said that in Malta British policy tended to be a mere response to the activities of France, rather than something positive, existing in its own right. But for the French attack, it is doubtful whether any British government would have seriously contemplated taking permanent possession of the island. It can hardly be said that this great naval base was acquired by Britain 'in a fit of absence of mind' but it is a curious irony (and a great tribute to the influence of seapower) that it should have fallen to her rather than to France, whose influence in Malta had for a century been overwhelmingly greater.

¹ England to Grenville, 31 March and 31 May 1798, F.O. 49/2.

² Hardman, *op. cit.* Chap. II *passim*.

³ *Despatches and Letters of Lord Nelson*, ed. Sir N. H. Nicholas (London, 1845), Vol. IV, pp. 42, 49, 65, 75, 103.

⁴ A good discussion of the advantages Britain might reap by possession of Malta can be found in an undated paper endorsed 'Malta, Sir A. Ball', in the Nelson Papers, British Museum Additional MSS. 34932, fols. 181-3. It is interesting to notice that even now one of the main arguments for a base there was that it would stimulate the extension of British trade with central and eastern Europe via the Danube, Dniester and Black Sea.

UNDER SAIL TO NEW ZEALAND IN 1870

By Commander C. H. Williams, R.N.R.

IN 1869, the year in which the ship *Cutty Sark* was built, several other fine clippers were launched. Among these was the *Otago* of 993 tons; about the same size as the *Cutty Sark* and, like her, a composite ship. She was a full-rigged ship with double topsails, was built by Duncan of Glasgow for Patrick Henderson, and was said to have been 'fitted out especially for the comfort of passengers'. Her captain described her as having iron topsides and composite below.

She was employed in the New Zealand emigrant trade, and for a number of years made consistently good passages out and home. These little ships often carried over two hundred passengers, and must therefore have been somewhat crowded. A good deal of the voyage would be in fine weather, however, and there would then be plenty to interest the observant traveller. As well as the working of the ship, the trimming of sails and yards, there would be, in light winds and calms, animal and bird life such as the modern ocean passenger seldom has the opportunity of seeing.

During a passage from London to Otago, N.Z., in 1870, a weather book or meteorological log-book was kept in the ship. This log-book, which was written up by the ship's master, Captain George Rennie Stuart, is still in the possession of the Marine Branch of the Meteorological Office, Air Ministry, from which department permission has been obtained for the following notes to be published. The passage was in no way an unusual one, but the notes may nevertheless be of interest.

On this particular outward passage fine weather was carried well down into the South Atlantic, for the log-book shows that the ship was in latitude 22° S. before the Main Royal was furled 'for the first time since leaving London River'. Later on, when running the Easting down in the Roaring Forties, some heavy weather was experienced. Life would then have been somewhat uncomfortable for the passengers, who might have to be battened down in cramped quarters for several days at a time.

Few seamen to-day, and fewer landmen, will be able adequately to picture the hard manual work and seamanlike skill that lay behind such a conic log-book remarks as: '6 a.m. Furled upper-topsails, mainsail and inner-jib.' and 'Midnight. Wore ship to the Eastward.' (The job of Wearing Ship would require all hands and might take the best part of an hour from start to finish.)

Captain Stuart evidently knew how to carry sail; to 'crack on'; for the log-book records that at 10-11 p.m. on 18 November the wind was force 8 (a wind speed of about 36 knots) before he 'took in stud'sls and all light sails'.

From the log it seems that after leaving the Thames on 21 September the *Otago* had a fair wind down Channel and landed her pilot at Dartmouth on 23 September; on the 24th she had calms and dense fog. The fog cleared at midnight and from then until she reached lat. 7° N., on 15 October she had mainly light to moderate N. to N.E. winds.

She crossed the Equator on 19 October in about long. 30° W., wind S.S.E., force 4. Fine trade-wind weather.

At 6 p.m. on the 20th the Pyramid of Fernando de Noronha was in sight bearing W. by N., distance 15 miles. The next day the log-book shows that several vessels were in company, almost the first outward bound ships seen so far.

On 26 October, when in lat. $22^{\circ} 26'$ S., long. $32^{\circ} 42'$ W., the log records: '10.45 a.m. The wind chopped suddenly into the S'ward, fresh, with rain. Took in royals and all light sails and braced up on the Starboard tack. The first time the Main Royal has been in since leaving home.'

Several albatross were seen on the 30th. On 2 November, in lat. $40^{\circ} 02'$ S., long. $27^{\circ} 00'$ W., 'Wind S.E. force 8-9. 6 a.m. Furled Upper Topsails, Mainsail and Inner Jib'... 'Midnight, Wore ship to the Eastward.'

The entries for 6, 7 and 8 November were: 'Calm. Sea smooth as in a tropical calm. Great numbers of jelly-fish in the water.... I never saw a calm like this out of the tropics; no swell and the water glassy.' On 12 November the entry was: 'Noon. Wind E. by N., force 8. Shortened sail to Lower Topsails and Courses. Rain.... Furled Mainsail and Inner Jib.' And on 13 November: 'Made all sail during the middle watch. Noon. Wind N.W., force 6.' The following day, with the wind N.W. by W., force 5, and the little ship running splendidly to the eastward, the Captain recorded: 'Sea very smooth. Ship going 11-12 knots at Midnight and scarcely swinging the cabin lamps.'

She had the usual strong westerly winds while running her easting down, and on Wednesday, 30 November, Captain Stuart noted in the log-book: '4 a.m. Wind N.W., force 7. Set Top'gls again and by 6 a.m. had all sail set, stud'ings both sides.... Since last Wed. we have had the steadiest strong wind I have ever seen out of the tropics; it has never fallen light, nor never been very strong. A good proof of it is that the ship has averaged over 12 knots for the whole week.'

Again, on 2 December the entry reads: 'Noon. Lat. $46^{\circ} 13'$ S., Long. $114^{\circ} 37'$ E. Wind North, force 5. Blue sky. The water is so smooth that although we are going 12 knots we can scarcely feel any motion.'

On 6 December, when in lat. $48^{\circ} 37'$ S., long. $137^{\circ} 18'$ E. the ship ran into some trouble. The Meteorological Log entry for that day reads:

4 a.m., Wind W. by N. force 10. Split upper main topsail at 8 a.m. Noon. Wind W.N.W. force 11. Blowing a very heavy gale of wind with strong squalls. Ship under lower topsails and foresail. Sea from W.S.W., about 50 feet. Soon after noon the wind died away suddenly and we had some tremendous seas break over us, one filling the main deck and the saloon, destroying among other things nearly all the books etc. I have from the Board of Trade, as it filled the drawers they were in. It also broke the box the thermometers were in on the poop, although it was quite 5 feet above the deck. Another sea soon after broke over the stern; I think ten feet above the level of the deck. I never saw such large unbroken waves before, and what made it worse was that there were three different seas running; one from W.S.W. (the heaviest), one from N.N.W., and the other from S.S.W. I never saw such a confused heavy broken sea before. I only wonder we did no more damage. After 6 p.m. there was more wind again and we made sail to the main top'gls and the ship went along drier, though still shipping a great deal of water. Midnight. Wind S.W. force 9. The sea getting less.

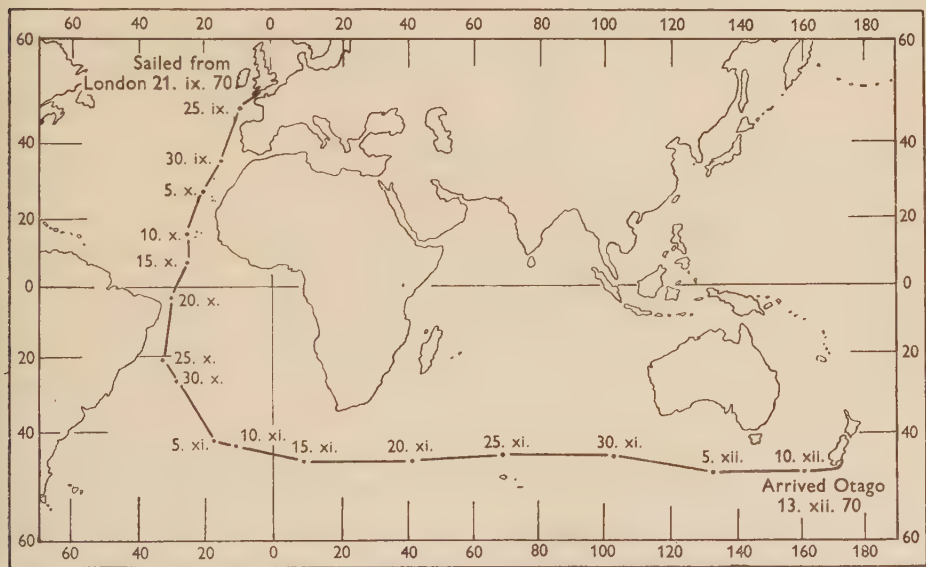


Fig. 1. Track of the ship *Otago* in 1870.

At 8 p.m. on 11 December 1870 South Cape, Stewarts Island, was bearing North, distant 5 miles, and at 9 a.m. on the 13th the *Otago* anchored off Otago Heads to wait tide time to cross the bar.

The *Otago* had sailed from Gravesend on 21 September and had crossed the Equator on 19 October in about long. 30° W., when 28 days out. The longitude of the Cape of Good Hope was passed on 17 November in

lat. $45^{\circ} 40'$ S., and she ran her easting down on about that parallel. Her approximate track is shown on the chart, drawn through the log-book positions of every fifth day or so.

(The reason for her track being so far to the westward in the South Atlantic was, of course, that she was sailing close-hauled on the Port tack through the South-East trade-wind belt. After that she had the 'Westerlies' to drive her to the eastward.)

She arrived at Otago harbour on 13 December 1870 in 83 days from London River. A good passage.

In 1887 her rig was cut down from that of a ship to a barque. Subsequently, she was sold to a Portuguese firm and re-named *Ermilla*. During the 1914-18 war she was torpedoed and sunk.

DOCUMENT

MEMOIRES D'UN PROTESTANT

By Jean Martulle de Bergerac

A French galley slave's description of an engagement in the Thames estuary between a fleet of French galleys under the command of Captain M. de Langeron of the French Navy and a British convoy under the protection of H.M.S. Nightingale (frigate 36 guns) on 5 September 1708. De Bergerac was a galley slave in the ship commanded by de Langeron.

Translated from the original documents by LADY FAWCETT.

At the beginning of the summer of 1708 the Queen of England had a coastguard ship of 70 guns commanded by a secret Catholic who was very bitter against his own country. This Captain, named Smith, was attached to no squadron, so was alone, and therefore free to carry out his treachery. He took his ship to Gothenburg in Sweden, and sold her either to the King of Sweden, or privately, I cannot say. Be that as may, he sold her and received the money. He then dismissed the crew, and went personally to the French court to offer his services to the King against England.

He was very well received and promised the post of captain in the first vacant ship. He was advised, however, while waiting, to go to Dunkirk and engage as a volunteer in one of M. de Langeron's galleys. Orders were given that he was to be treated with honour and respect. Captain Smith realized that this was a tacit command from the King, and was courteously received by de Langeron, who also maintained him.

Captain Smith was in all the attacks we made on the English coast. He was anxious that we should make landings as he wished to distinguish himself personally by burning villages. It was however dangerous to do this [*de s'y frotter*] as there were coastguards all along the coast, and in many places regular land soldiers whom all seagoing folk fear like the devil.

Captain Smith, burning with hatred against his own country, always had his head full of schemes to annoy the English. He sent these plans to the court, in which he proposed among others to burn and pillage the little town of Harwich at the mouth of the Thames (*sic*), and for which he demanded that six Dunkirk galleys be placed under his command.

The King approved this suggestion, and ordered M. de Langeron, our commandant to carry out all Captain Smith's orders for this expedition, and also the Marine Intendant to supply him with everything that might be needed.

M. de Langeron, though reluctant at having to serve under a foreigner, and one of doubtful character, obeyed, apparently with a good grace. He told Smith that he had only to order everything necessary for the expedition, and to arrange for the departure of the galleys.

Smith shipped all he had asked for from the Intendant, combustible materials, etc., in

fact everything necessary for the sack of Harwich, as well as reinforcements of soldiers for the landing. All being thus prepared, one fine morning, on 5 September [1708], we set out in as perfect weather for galleys as could be wished.

A light north-east wind was so in our favour that we arrived at the mouth of the Thames under only our little sails, without rowing, about five o'clock in the evening. Smith considered this too early, and that we would be seen, which would ruin everything. So he ordered us to go more out to sea to await nightfall for the landing, which we accordingly did. We had hardly hove-to for more than a quarter of an hour, when the look out in the mainmast cried out, 'Ships in sight'. 'Where?' we asked. 'To the north'. 'On what route?' 'West', he replied; 'How many sail?' '36', said he, 'Of what class?' '35 merchant ships and a frigate of about 36 guns apparently as escort', replied the look-out sentinel. It was in fact a merchant fleet from the Texel making for the Thames.

Our captain then held a council-of-war, and it was decided to give up the expedition to Harwich and to try to seize the fleet, which was much more important to the King than the burning of Harwich. One did not get chances every day of taking such valuable booty, whereas Harwich could be attacked any time.

Our commandant gave all these reasons to Captain Smith who raged and protested against the decision of the council-of-war, insisting that we must obey the King's orders and not be diverted into any other enterprise, and that we must even withdraw a little to the south, to give this fleet room to enter the Thames without seeing us. The war council, however, held fast to their decision. They were secretly glad of the collapse of the Harwich expedition, from jealousy, having been obliged to obey Smith's orders.

After the council, each galley captain received the commandant's orders for the attack on this fleet. We made towards it both with sail and oars, and as it was also coming in our direction, we were soon near one another.

Our commandant had so arranged his fleet, that four galleys were to surround the merchant fleet and not to leave it until we had taken their ships. Most of them were unarmed. Our galley, which was the flagship, was to join with M. de Marvilleux's galley and to attack and sieze the frigate which was acting as escort.

Following these instructions, the four galleys made for the merchant ships to prevent them from entering the mouth of the Thames. We, with our reserve, made straight for the frigate, which realized from these manoeuvres that her fleet, or at least part of it, was in great danger. This frigate was English, and her captain one of the most prudent and bravest of his time, as he showed on this occasion. He ordered the merchant ships to make all sail towards the mouth of the Thames as soon as possible, so as not to fall into the hands of the French. He added that he hoped to save them all, by giving as much trouble as possible to the six attacking galleys. In a word he was going to sacrifice himself for them. He made all sail, and bore down on our two galleys, who were about to attack him, as if he were the attacker. Our reserve galley had lagged more than a league astern, for either she was not sailing well or else the captain in command intended to let us bear the brunt of the first attack alone.

Our commandant was not alarmed at the frigate's attack as he believed that our galley was strong enough to overpower her, but as the event will prove he was very wrong in his conjecture.

This frigate as I have already said, was bearing down on us, and as we were making towards her, we were soon within cannon shot. We did in fact fire a round at the frigate, who did not reply. This made our commandant announce boastingly that this frigate was no doubt tired of being English, and was going to surrender without a fight. But patience, he soon had to change his tune. We advanced so quickly towards one another, that our galley was soon within cannon shot. Our musketeers were just about to open fire on the frigate, when suddenly she went about as if she wished to escape from us. The flight of an enemy's ship increases one's courage, and the flight of the frigate increased that of our crew, who shouted out to the enemy that they were cowards in avoiding a fight with us, and not to waste any more time but to strike their flag and surrender, or they would be sunk. The Englishman did not reply, but prepared to inflict a terrible tragedy on us as will soon be seen.

The frigate while pretending to fly turned her stern towards us, which would give us every advantage in boarding her. The manoeuvre of a galley in attacking a ship is to attack the stern first, always the most vulnerable spot, with the galley's prow which is her strongest point, having all her guns there as well as her ram. She tries thus to pierce the enemy while firing all her five guns. She then prepares to board.

The commandant of the galley ordered this attack, hoping to destroy the frigate, and ordered the helmsman to bear straight down so as to pierce her with our ram. All our soldiers and sailors, with swords and axes in their hands were ready to board. Suddenly the frigate who had guessed our manoeuvre, avoided our ram which was about to pierce her vital spot, by a swift turn of her helm. So instead of injuring the frigate, as we had hoped to do, we found ourselves suddenly alongside, so close that all our oars were smashed into fragments by the contact.

The skill of the English captain was marvellous, as he had foreseen this result, and had everything ready, such as grappling irons with which he secured us to the side of his ship. He then regaled us with his artillery, all his guns being loaded with grape. Everyone in the galley was quite unprotected as if on an exposed raft, and not a single shot, being point blank, missed its mark; the carnage was appalling. Also the frigates captain had some of his crew at the masthead, with barrels full of grenades which fell on us like hail-stones, so that in a few seconds all our crew were put out of action and were not able to put up any defence. Those not dead or wounded crouched down pretending death. The officers were so terror-struck, that they, as well as their crew gave their throats to the enemy, so to speak. The English captain seeing our fright, sent forty or fifty men from his ship, who boarded our galley sword in hand and cut to pieces all the crew they could find, only sparing the galley slaves who could not defend themselves. They then returned to their frigate and continued to bombard us with musketry fire and grenades. M. de Langeron, our commandant, seeing us reduced to such a pass that there was no one

on his feet in the galley but himself, and fearing a more terrible fate, hoisted the signal for help, thus calling all the galleys of his squadron to his assistance. Our reserve was soon with us. The four who had already attacked and taken most of the merchant ships, on seeing this signal left their prizes to come to his aid. They thus abandoned the Thames mouth, so that the merchant ships again hoisted sail and made up the river. All the galleys made such speed, that in less than half an hour all the six surrounded the frigate, which soon was no longer in a state to fire either guns or muskets, also none of her crew appeared on deck. Twenty-five grenadiers from each galley were ordered to board the frigate, they had no trouble in doing so as their attack was not disputed, but as soon as they were on the deck of the frigate they found someone to talk to. The officers had intrenched themselves under the stern cabin, and poured a fire of grape from small guns upon the grenadiers. This made them realize that the enemy had not yet surrendered. Another detachment was ordered to board, but they came back quicker than they had mounted. It became necessary to use crow-bars and other instruments, so as to make an opening in the deck in order to dislodge the crew of the frigate, and to seize the decks. This was done in spite of fire from guns and blows of pikes, which killed and wounded many. Overcome by superior numbers, the crew was forced out from below the two decks and made prisoners. The officers still entrenched under the rear cabin, kept up a fierce fire with their little guns (falconets). It was therefore necessary to force them out, but not without loss. All the crew and officers, except the captain, surrendered. The captain had shut himself in his poop cabin. He kept up a fire with various guns and pistols he had with him, swearing like a devil, that he would not surrender as long as he was alive. His officers, now prisoners-of-war in our commandant's galley, said that their captain was a fire-eater and would rather set his ship on fire than surrender. This news alarmed us all, and this fear was the worst of anything we had yet experienced, for we expected to see ourselves blown into the air.

The captain was in the poop cabin which had an entrance to the powder magazine, he could therefore set it on fire in the twinkling of an eye, it would blow the frigate up and with her our six galleys. There were more than 3000 men in the six galleys, and we were all petrified at death from this great danger.

In this extremity it was resolved to summon the captain to surrender, with all courtesy, promising him every good treatment. But he only replied with heavy gun fire. Finally it was resolved to proceed to the extreme remedy, namely to capture him dead or alive. To effect this, a sergeant with 12 grenadiers armed with guns and bayonets, were ordered to break down the door and compel the captain to surrender. The sergeant at the head of his men, soon forced the door, but the captain was ready for him with a pistol in his hand. He shattered the sergeant's head and threw him down stone dead. The twelve grenadiers on seeing this, fled fearing the same fate. The officers found it impossible to make the other soldiers attack, as they said in their defence, that as they could only enter the cabin one at a time, the captain would be able to kill them separately.

The captain had only resisted to keep the galleys in play to give his fleet time to escape

up the Thames. Seeing by their flag signals that they were all in safely, he made no more trouble about surrendering. But to give more time to some laggards in the fleet, and hoping that nightfall would also save them from French pursuit, he devised yet another delay, saying that he would only surrender his sword to the commandant of the galley, who must come on board to take it. A truce was arranged to take this message to our commandant. He sent his second-in-command, to represent to the captain that it was the duty of the commandant to remain at his post. The captain, who had nothing more to do for the safety of his fleet, now gave up his sword, and was conducted to the galley. Our commandant, who was amazed to see a little man, deformed and hunchbacked, complimented this captain, saying it was the fortune of war, and that he would be consoled for the loss of his ship, by the good treatment that he was going to receive. The captain replied that he did not regret the loss of his frigate, as he had succeeded in his design, which was to save the fleet confined to her. He had resolved as soon as he saw us, to sacrifice his ship and himself, to preserve the goods he was to defend. 'You will find', he added, 'a little lead and powder that I had not time to bestow on you, these are the only things you will find in my frigate. For the rest you will treat me honourably, and I will guarantee that some of my nation will do the same to you on a like occasion'.

This noble courage charmed de Langeron, who, giving him back his sword, said courteously: 'Take back your sword, sir, you are worthy to carry it, and you are only my prisoner in name.'

Shortly afterwards the commandant had occasion to regret having given back the sword, which nearly caused an unpleasant incident. The captain on being taken to the poop cabin of the galley, saw the traitor Smith there, he recognized him at once; there was £1000 reward on Smith's head in England. 'Scoundrel', he cried, 'you will meet death at my hand though you have escaped the public hangman.' At the same time he attacked Smith and tried to run him through. But our commandant seized the captain's arm to prevent this, much to the captain's regret, who protested that he would rather have killed Smith than taken the six galleys. Captain Smith was very upset at this incident, and begged the commandant to put the prisoner in some other galley. The commandant, however, replied that this captain was his prisoner and would stay where he was, and that Smith could go in some other galley if he wished, which was accordingly done.

We manned our prize, she was called *Nightingale*, but I have forgotten the name of the brave captain.

We sailed at first from the Thames with our prize, but we had to make a false route, and escaped at nightfall from two large men-of-war which left the Thames and pursued us. They could not overtake us, and this false route enabled us to reach Dunkirk only three days later without any disastrous attacks.

The bad feeling of Captain Smith for his country continued; never was such hatred shown against the English as shown by this infamous traitor. If an English vessel was taken by our corsairs, this bitter enemy of his own country never failed to visit the prison

where the crews were confined. He cursed and raved at them and would have torn out their eyes had he been allowed to do so. He actually gave money to the jailers and sentinels on guard to prevent these wretched prisoners from receiving charity from kindly souls. We, the five Protestants, were with Smith in de Langeron's galley and had a friend in him, otherwise Smith would never have failed to order us a daily whipping, because we were of the religion of our enemy the English.

This traitor was so bitter against his own country, that he conceived a plan to harass the English. As Smith knew all their coasts perfectly and was an experienced and clever sailor, the French were pleased with his ideas, though they did not esteem him personally. He again proposed to burn and pillage the small town of Harwich on the coast of the Thames. The French Court had already approved of this suggestion which fell through because of the fight with the *Nightingale* which we had at the mouth of the river. On our return from this battle, Smith implored with all his might and main that we should try again, with six galleys and renew the same attack. But our commandant would not agree, alleging that in addition to the unfavourable season not suitable to galley navigation, that they were not in a fit state to put to sea, as not only were most of the crew killed and wounded, but that there was great loss and destruction of masts and spars of which the royal magazines were greatly lacking. This did not prevent Smith of accusing both captain and galley officers of indifference.

Our captain on his side sent an explanation in which he gave the above reasons which he said would prevent any such enterprise. All this roused the jealousy and hatred of our officers for the said Smith and caused his downfall, as will soon be seen.

Smith was not discouraged by the refusal of the Court to allow him six galleys for this expedition. He had still another project and demanded that he should be given the command of two men-of-war. Both were armed and in the port of Dunkirk, one had 40 guns and the other, a small frigate of English build, had 24 guns. He declared that with these two ships he could burn Harwich, which he said he could have done with six galleys.

The Court accepted this suggestion and ordered him to undertake it at once. But he was only allowed the command of the expedition and not of the two ships. A galley captain was allotted to the largest as admiral, and a lieutenant also from the galleys, as captain of the frigate. Smith was to command the attack on Harwich.

These two ships put to sea in October 1708 and set a course for the Thames. But when the coast of England appeared so did an English man-of-war of 70 guns guarding the coast. This worried the admiral who, after consulting Smith, arranged to lay a course to the north for some days. He hoped by this to conceal their plans from the guard-ship; they intended to return when she was no longer there. This was done, but on coming back after two or three days, they sighted the same coastguard ship, or possibly another of the same calibre. This contretemps was very disquieting and a council-of-war was held. Smith insisted strongly that as our two vessels were unusually well armed they were quite able to board and take the coastguard ship, powerful though she was. The admiral and

the captain of the frigate did not agree with him, but Smith was so obstinate and so set on his scheme, that the balance turned in his favour. Only one stipulation was made that he should take the little frigate, a light ship, and reconnoitre the guard-ship personally. After examining her defences, Smith was to signal the admiral, and begin the attack, but he was not to approach too near so as to avoid a broadside which would sink him.

Following this resolution, the admiral hove to, and Smith set sail with his little frigate to inspect the English ship which had also hove to as if in disdain of the little frigate.

Smith, against the advice of his officers came close up to the guard-ship, and was fool enough to put himself within cannon range of the English ship which at once launched a furious broadside, which destroyed the frigate's masts and prevented her escape from capture or complete destruction. The French admiral seeing this disaster, instead of coming to the rescue at once as he had promised, in case of need, made all sail and ran for Dunkirk, where he brought the news of the loss of Captain Smith and his frigate.

The guard-ship seeing her enemy ship dismayed and incapable of escape, called out to lower their flag and surrender, otherwise their ship would be sunk. Smith would not consent to this, he preferred to die sword in hand rather than by the London hangman. But he had not the strongest will on board, for officers and sailors all threatened to throw him overboard if he did not surrender, which he was therefore obliged to do. He had, however, made a plan to escape the hangman. He took a piece of lighted tinder hidden in his sleeve and tried to descend into the powder magazine to set it on fire and so blow up the frigate. The sentinel on duty then stopped him and cried to his comrades that Smith wished to destroy the frigate. They threw themselves on this creature and tied him, neck and crop, to the main mast. They then struck their flag and cried to the coastguard that they surrendered unconditionally. The English vessel sent an armed launch with an officer to take possession, which he did without the least opposition, all the crew crying for quarter. The English at once saw Captain Smith lashed to the mast. He was recognized and taken aboard the coastguard ship, which fired all her guns in rejoicing. They would rather have taken this ignoble traitor than gained the reward of £1000 sterling which was on his head.

He was taken to London and his trial was soon over. In spite of his cowardly offer to turn Protestant to obtain pardon, he was condemned to be hanged, drawn and quartered, which was duly carried out in the way that they deal with traitors in England. He was struck in the face by his still living heart.

I saw in 1713, when I was in London, pieces of his body exposed all along the Thames-side. A good lesson to those who like him, give way to their feelings to such an extent that they betray their own country.

NOTES

SPAR TORPEDO, ITS DEVELOPMENT, TACTICAL USE,
AND MODE OF DETONATION

Originally the term 'torpedo' was applied to the forerunners of both the present-day torpedo and the present-day mine. An American authority, Lieut.-Commander Barnes, U.S.N., writing in 1869, classified the former as 'offensive torpedoes', and the latter as 'defensive torpedoes'. Indeed there was little difference in their respective modes of construction and detonation. At that time, the principal, if not the sole, distinction was that one class was pushed or towed against the enemy, while the other was moored in his anticipated path. (A question arises as into which category do we place the 'drift torpedoes' of the American Civil War. These were floating charges, fitted with time or contact fuses, which were set adrift by the Southern Confederates to be carried downstream into the midst of the Federal fleet.)

A British naval officer, writing on the subject of mines and torpedoes, has stated that both these weapons first came into existence during the American Civil War. This is not exactly true, for there are accounts of mines, or 'defensive torpedoes', being developed and successfully demonstrated at a much earlier date. But it is true that the Civil War of 1860-5 saw the first successful wartime use of submarine weapons, both offensive and defensive. In the course of that war no less than twenty-eight vessels were sunk or seriously disabled by mines, and six more fell victim to torpedoes, generally some form of the spar torpedo.

It is usually the weaker naval power which turns to novel forms of submarine warfare. This was true of the Southern Confederacy. Early in the Civil War there was formed a Confederate States Submarine Battery Service, supported by a Torpedo Bureau responsible for research, development, and supply. Many ingenious submarine weapons were developed—one might say, improvised—by the Confederate Torpedo Bureau: small contact mines to be attached to underwater obstructions; harbour defence mines, both contact and electrically detonated; ingenious sweep-proof mines; and several types of offensive torpedo, all essentially variations of the spar torpedo.

A very common type of moored defensive mine was constructed from a beer barrel filled with up to 120 lb. of black powder, fitted with five or more percussion detonators and with conical wooden fairwaters on each end. From this weapon developed the 'ram torpedo', a progenitor of the spar torpedo. In place of the hemp and chain mooring bridle used on the mine, two heavy steel hoops were secured around the barrel, to these were riveted a loop and socket into which a spar was thrust.

The early ram torpedoes were rather cumbersome weapons and were usually employed by ironclads rather than any form of torpedo boat. The torpedo was secured at the end of a 20 or 30 ft. spar, the other end of which was fitted to a sturdy swivelling socket located on the ironclad's stem at the water-line. A topping-lift and guys were provided for lowering the spar and holding it in position.

A later model of the ram torpedo was made of copper. The forward end was in the form of a hemisphere with a conical afterbody which faired into a socket to take the end of the spar. The cone and hemisphere held about 150 lb. of black powder. A smaller version of the copper ram torpedo, cylindrical in form, carried a 50 lb. charge. This latter was the weapon of the 'Davids', the Confederate submersibles which did serious damage to the Federal blockading fleet, but only at the cost of nearly all their own crews.

Apparently all classes of ram torpedo were exploded by percussion detonators of either the fulminate of mercury, or the frangible acid container type.

Unlike later spar torpedoes the ram torpedo could be detonated only by running the carrying vessel head-on at the target. They were in effect explosive rams. But the spar torpedo used by Lieutenant Cushing of the Federal navy in his attack on the Confederate ironclad *Albemarle*, in

October 1864, was closer in form and method of tactical use to the spar torpedoes employed twenty-five years later.

Although Cushing's torpedo boat was basically a steam launch similar to that regularly carried by large men-of-war, it appears to have been specifically designed and fitted out for torpedo-carrying duties.

The torpedo used by Cushing was a copper cylinder with a conical head. The after end of the cylinder was partitioned off to form an air chamber, forward of the partition was the powder charge. Running through the centre of the air space and well into the powder chamber was a closed tube, the after end of which projected out of the rear of the torpedo. At the forward end of the tube was a fulminate of mercury percussion cap, at the after end an iron ball held in place by a pin. The torpedo was carried at the end of a spar on a special releasing gear. Just prior to the strike the spar was rigged out and down, when under the target the torpedo was released from the end of the spar. The torpedo now floated head down. Immediately the lanyard attached to the retaining pin was pulled releasing the iron ball to fall on the percussion cap.

The advantages of releasing the torpedo immediately prior to firing are not clear. Certainly it is known that later types of spar torpedoes, whatever their mode of detonation, were fixed to the end of the spar.

The years following the end of the American Civil War saw the adoption of torpedo nets and quick-firing anti-torpedo batteries for the protection of capital ships, and the development of the automobile torpedo. Seemingly all this should have rendered the spar torpedo obsolete. Nevertheless, the spar torpedo is described in a book published in 1896 as a weapon then in current use.

Several factors may account for the longevity of the spar torpedo. First, the spar torpedo was simple and cheap. Using it any reasonably fast steam launch or pinnace could serve as a torpedo boat. Above all, it worked: it sank ships in the American Civil War, it caused great damage in the Russo-Turkish War of 1877-8, and, during the Franco-Chinese War of 1884, it accounted for the destruction of several Chinese warships. The spar torpedo was well adapted to the destruction of harbour defence booms and similar devices.

Although by 1880 the Whitehead automobile torpedo had reached a high state of development, it was far from perfect. Mechanical maladjustments readily produced erratic behaviour as to course and depth. A relatively low speed presented opportunities for evasion by the target, and the peril of a fast-moving torpedo boat over-running its own torpedo. The pioneering era of torpedo warfare produced many ingenious but cumbersome weapons such as the Brennan 'Locomotive' torpedo, the Sims-Edison electric torpedo, and the Howell torpedo, the sole source of propulsion of which was a flywheel set in rotation prior to launching. Beside these wonderful engines the spar torpedo was a model of simplicity and reliability.

As previously mentioned, the first torpedo boats were but ordinary steam launches or steam pinnaces. The first vessel designed for service exclusively as a torpedo boat is generally considered to be the little 57 ft. steamer built by Thornycroft in 1873 for the Norwegian Navy. This vessel was designed for use with spar and towed torpedoes. Subsequent torpedo vessels constructed in the late 1870's and early 1880's were fitted both to handle spar torpedoes and with dropping gear for automobile torpedoes. Simultaneously the development of the torpedo-carrying launch or pinnace continued. From these latter evolved the 'second class' torpedo boat carried aboard most capital ships in the later years of the nineteenth century.

Even in their later stages of development, the second-class boats and their armament bore a strong resemblance to Cushing's launch and spar torpedo. The boats were small steamers seldom over 50 ft. in length, frequently constructed of steel. Their armament consisted of a spar about 40 ft. long, to the end of which was bolted a cylindrical canister of wet gun-cotton. An electric detonator in the rear of the canister was connected by waterproof electric cables to an electric battery located in the boat. Normally several spare canisters and spars would be carried. The spar was rigged so that it could be readily run out through a swivelled crutch at or near the bow. Some of the later boats were also fitted with dropping gear for Whitehead torpedoes.

Attacks were made under cover of darkness. The boats were painted a dull black and the crews blackened their faces. Approaching the target the spar was run out with the charge in the air.

While some strikes were made head-on, it was generally preferable to attack on a course parallel to that of the target. When abreast of the target, at about 40 ft. off, the charge would be dropped; the force of the water would swing it around and against the target. With the spar at right angles to the course of the boat, the torpedo boat commander would press the key closing the firing circuit. In some torpedo boats the circuit was also broken at the spar swivel. In this case, with the commander's firing key closed, the torpedo would be automatically detonated when the spar swung through a full ninety degrees.

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W. R. HOPKINS

SPAR TORPEDO

It may be news to some of even the oldest members that the spar torpedo was being regularly exercised in at least one British man-of-war in 1903. My Midshipman's Log of the cruiser *Argonaut* (Captain G. H. Cherry) in China mentions 'rigged Outrigger boat' on 23 January at 9.40 p.m., at Singapore, and again on 6 July at Wei-Hai-Wei.

Midshipmen under instruction took a lively part in these exercises. While the picquet boat was armed with two 14 in. Whitehead torpedoes, the 'steam puncher' (steam pinnace) carried the spar torpedo. It was a 16½ lb. tin of guncotton at the end of a properly fitted spar, run out over the bows on near approach to the target, and in the real thing fired electrically as the spar was heard to break on the target. For exercise the targets were imaginary, but the charge was exploded. The drill, I feel sure, is given in the drill books of the period.

S. H. S. MOXLEY

MORE LIGHT ON THE CHESAPEAKE

May I correct a small error which has crept into the first and last paragraphs of Mr Steel's article in the November *M.M.*? The American ship concerned was not the U.S.S. *Constitution* but the U.S.S. *President*, 44 (Commodore John Rodgers); the British ship was H.M.S. *Lille Belt*, 24 (Commander Arthur Bingham), sometimes referred to as the *Little Belt*. The incident took place on 16 May 1811, and lasted for three-quarters of an hour, the losses in the *Lille Belt* being nine killed and twenty-three wounded, of whom four died later. Bingham put up a very stout resistance against his much stronger adversary and, when called upon to strike his colours, refused. He brought his ship, though much damaged in hull, masts and rigging, safely into Halifax. He was promoted on 7 February 1812.

P. K. KEMP

CURIOSITIES IN NAUTICAL TERMS

There must be many contributors to *The Mariner's Mirror* who neither possess nor have easy access to a complete set of the *Journal*. Therefore it must be expected that there will be overlapping, and comments made which have already been made before. It seems, however, that some notes and enquiries need never arise if contributors were to consult the various sea dictionaries and word-books that are in existence.

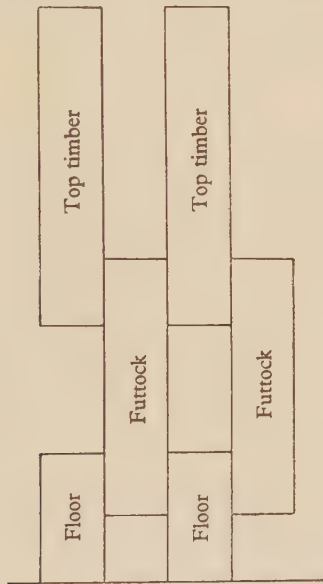
I am reminded of this upon coming across what I guess to be a little-known book; it is *Sailors' Language*, by W. Clark Russell (1883). Clark Russell was a painstaking nautical author; in this case his vocabulary belongs to the men of the Merchant Service. I see definitions of *dandy funk* and *dogsbody*, and that *doctor* is given as one of the names of the cook besides *drainings* and *slushy*. This little book will repay attention.

E. WADE-KILLICK

THE FRAMING OF MODELS—AND OF ACTUAL SHIPS

In spite of Mr Baker's objections (*M.M.* February 1954) I must still maintain that the normal framing of a seventeenth-century 'Navy Board' model does *not* give anything like a true representation of that of an actual ship. Even admitting that the first futtocks did fit tightly between the floors and make a continuous band of timber there, as there is in the models, there was no continuity corresponding to that shown in models near the waterline, while there were four or five levels of overlap on either side instead of two. A comparison of my drawing with Mr Baker's second will make this clear.

On the other hand, I have to admit that, when dealing with seventeenth-century ships, I was wrong in saying that the floors, 2nd futtocks and 4th futtocks butted against one another and that the 1st futtocks, 3rd futtocks and top-timbers did the same; here Mr Baker certainly has the better of the argument. There is in the National Maritime Museum a collection of contracts for building men-of-war ranging from 1689 to 1702 (with one of 1649) and in every case the 'scarph' or overlap between the various members of the frame is specified. This certainly proves that there were 'spurkets' between the adjacent ends.



Framing of a model (diagrammatic)

By the middle of the eighteenth century this was no longer the case; the various members of the two strips forming a single frame did butt against one another as I said. This is shown very clearly in the diagram on Falconer's Plate 1 (1769) and rather less clearly in Sutherland's Figs. E and F (p. 42) with the text on pp. 43-4 (1711). Sutherland tells us that the timbers were 'equally scarfed, the middle of one timber being in the wake of the head and heels of the others'.

The question is: when did the change take place? The interval between 1702 and 1711 is very short, and yet Sutherland says nothing to show that what he describes was an innovation, though his specimen contract for building a ship on the 'Old accustomed Scantling' does specify a minimum scarph for the futtocks in seventeenth-century fashion.

Another early example of butted frames is to be found in a series of engraved plates, both plans and text, bound together with the contracts already mentioned. The title is very long, but the

more important parts are as follows: 'The Bends of a Ship, Their various sorts and shapes. How to serve in the Timbers . . . for new work or repairs . . . at such a price as that First and Second Rate ships may be built for £11 per ton . . . By Thomas Fagge, Esq. Sold by R. Wilkin at the Kingshead in St Paul's Churchyard, London.' The publication is in effect an illustrated guide for timber-merchants to the requirements of shipbuilders.

Here there is no possible room for doubt. In one place the lengths given for the various timbers can be checked against the marks on the plan, in another we find the same letter noted as marking the head of one timber and the heel of the next. Everything butts against something else, except the heels of the two lower futtocks, which lie well apart on either side of the keel.

Unfortunately the title-page bears no date, but it is possible to fix one within comparatively narrow limits. Wilkin's activities at the address given lay between 1693 and 1720, while internal evidence suggests something not later than 1705. Fagge gives a table of scantlings for a 3-decker of about 1500 tons and a 3rd-rate of 1000-1100 tons, while the moulded beam of another 3rd-rate on sheet 3 is approximately 39 ft. 4 in. These figures, especially the last, seem to me to show that the Establishment of 1706 was not yet in force, since that gave the 70-gun ships an extreme beam of 41 ft., which would entail a moulded beam distinctly greater than Fagge's.

There is no need to labour the point, for Sutherland has already shown us that the new method was in use before 1711. Still, it may be worth while to note that a Thomas Fagge, shipowner, appears as a petitioner on 31 August 1704. This we know from an entry in the appropriate volume of the Calendar of State Papers, Domestic.

R. C. ANDERSON

THE FRAMING OF MODELS

To criticize our President's statements on any matter connected with seventeenth-century models is, of course, presumptuous to say the least. However, his recent remarks on the above subject, both in this *Journal* and elsewhere, have been of such an unusually definite nature that I suspect they were meant to provoke comment, and as none has appeared so far I hope that the following notes may help to clear up some of the points raised by him.

In brief, Dr Anderson's contention is that the Navy Board, or single foothook, frame does not represent the framing of the real ship, but was only a model maker's convention to produce a rigid hull of the right shape. With the first part, and with regard to the vast majority of surviving models, I am in full agreement, and may add that during the period covered by these models it would have been almost impossible to find timber to make such frames in any other than the smallest vessels. The second part of his contention I find more difficult to swallow without further evidence, and for convenience I will take this latter point first.

Conventions do not spring up overnight. Nevertheless, by 1660 we find a well-established school of English model makers, all using the single foothook frame. The models are so very similar in style that it is logical to look for some common origin, and if we try to identify the founder of such a school surely Phineas Pett suits the part to perfection. Not only do we know that he made scale models, timbered but not planked, but he is also the outstanding example of a shipwright who attained his advancement and distinction by first preparing a scale model for the attention of those in authority, and thereby securing an order to build. Nothing succeeds like success. By these means Pett, who was not otherwise outstanding in his profession, built the *Prince Royal* and the *Sovereign*, the two ships which caused more argument in shipbuilding circles than any others in Stuart times. Pett's success must have encouraged the art and practice of model making as no other single factor could have done, and although we might expect his imitators to try to outvie him in the structural accuracy of their models, it is reasonable to suppose that his prestige caused them to copy his style as closely as possible. This being the case, it is quite possible that Pett's early models were built on the usual single foothook system, and in this I find nothing strange.

Modelmakers have always tried to attain perfection, and as they are free from the limitation in the size of timber imposed on the builder of a real ship they can ignore the scarfs required in long members such as the keel, and also avoid the ekeings, chocks and other makeshifts which were

forced upon the shipwright. In other words, the model represents the ship as it *should* be built in the eyes of the modelmaker. The pieces comprising the frame were named the floor, foothook, and toptimber. These names are self explanatory, and indicate that for a long period, while ships were small, each piece was formed from a single piece of timber. This five-piece frame would continue as long as ships were comparatively small and the shipwright had a good choice of curved timber, but later, with ships growing in size at the same time that the supply of compass timber was becoming more and more restricted, it was found necessary to form each of these timbers of a progressively increasing number of pieces.

I might mention at this point that the change from clinker to carvel build must have had a revolutionary effect on the ship's frame. When the clinker-built hull outgrew the five-piece frame there would be a tendency for the size of the timbers inserted inside the planking to be limited to a manageable weight, in order to facilitate the operation of fitting or 'faying' the timber. This restriction would mostly affect the length, as being more convenient, and also because the frame was intended to stiffen, rather than to give shape to, the planking of the hull. The frame of a carvel hull, however, had to be stiff enough to support itself while building, and a shipwright would tend to use as long lengths as possible in order to reduce to a minimum any distortion prior to planking up. Weight would count for far less than in a clinker-built hull, since the frame would be shaped on the ground before being raised and fastened in place.

The first difficulty in providing timber for a large five-piece frame would be experienced in finding suitable foothooks, and two or more pieces of timber would have to be joined together. Now the only way to join timbers end to end is to scarf them, and it is of some importance to note that the word 'scarf' has two distinct meanings. In general, it means letting the ends of two timbers into each other so that the sides of both are flush, or nearly so. In the case of the frame timbers, however, it has a specialized meaning, and is applied to the overlap of the various members. I do not know how this secondary meaning was derived, but I am sure that it has some significance in the history of ship carpentry. At any rate, we do know that the members of a ship's frame were sometimes scarfed in the usual sense. Mainwaring's *Seaman's Dictionary* first defines the word 'Scarf' in the usual way, but goes on to say of the foothooks: '... the futtocks are those compassing timbers which give the breadth and bearing to the ship, which are *scarfed to* the ground timbers; and because no timbers that compass can be found long enough to go up through all the side of the ship, these compassing timbers are *scarfed one into the other*...' (the italics are mine). Another example of this 'true' scarfing of frame timbers is found in the Bursledon ship, although her clinker build and extraordinary size make it undesirable to draw any comparison. Incidentally, toptimbers were scarfed in this manner at a very late date, as may be seen in Steel's *Naval Architecture*, plate 11.

It is therefore quite clear that a model maker might be fully justified in ignoring such scarfs and forming his foothooks in one piece from keel to the height of breadth. In the real ship, however, these scarfs were an obvious source of weakness, and for the next development I will quote from the extract of Stow's *Annals*, printed by Charnock, where the *Prince Royal* is described as being 'double built'. Although a later report says that she was double planked, such a practice was too common to be worth a special remark, and I think it more likely that Stow meant that she was an early example of the use of double frames, where each piece supported, or gave scarf to, the butts of the adjacent pieces. These butts might have been scarfed and not left plain as at a later date, but in any case the *Prince Royal's* frame could not have been too novel in design, or it would have been mentioned by Pett's critics at the enquiry while she was building. It may, however, be worthy of mention that the King thought 'that the ship would be too strong if one third of the timbers were left out'. Was His Majesty thinking of a model framed with single foothooks?

The earliest English model I know which shows the double frames is that of the *Loyal London*, formerly in the Trinity House collection. In this model the scantlings are very heavy, and presumably there should be a single filling timber between the double frames. If the filling timbers were double and the same siding as the frames the bottom would have been solid. Rather luckily for my peace of mind, we have Dr Anderson's confirmation that her timbering resembles a Danish model more closely than that of any other English example.

It is more than likely that both systems existed side by side during the first half of the seventeenth century, double frames being used in all large ships and rapidly becoming general in smaller ones as time went on. The new style would probably be adopted very quickly in merchant ships of all sizes, since the shorter lengths of compass timber now necessary would be far easier to obtain and therefore much cheaper. The greater cost of fastenings would probably be offset by the increasing production of iron. There is an excellent draught of a Dutch two-decked ship of 1648 in the Scheepvaart Museum, Amsterdam, which is reproduced in J. R. Steven's *Old Time Ships*. This shows the single foothook frame in a most convincing manner, with the heads and heels of the individual timbers left irregular and not trimmed off 'to a sirmark' as was done by the conscientious model maker. Except for the sidings of the timbers being rather on the small side it is exactly like the Navy Board models.

The other outstanding feature of the single foothook model is the continuous band of timbers along the bilges and also level with the lower deck. The first of these we know to have been common practice in the seventeenth century. Sutherland says so, and adds that it was discontinued because it overscantled the ship and caused rot. Nevertheless, a solid bilge was considered to have some advantages right up to the Sepping system of filling the frame. I have a copy of a contract for building a merchant ship in 1798 which requires: 'Oak chocks to be drove hard betwixt the timbers upon a line in the turn of the bilge from Stem to Stern to form a sort of strong arch which will prevent in a great degree the vessel from hogging.' The remains of the *Sparrowhawk*, wrecked near Cape Cod in 1626, show a similar feature, wedges having been driven into the one inch gap between each floor and the foothook of the next frame (*American Neptune*, January, 1953). Dr Anderson quotes scantlings which leave a gap of $\frac{1}{4}$ in., and remarks that this was not quite a tight fit, but as the frame timbers were first erected and bolted to the keel and the remaining floors and foothooks fitted in afterwards we must not begrudge the shipwright some margin in working timber of large scantling. As for the model maker, $\frac{1}{4}$ in. represents the thickness of a seam, or about $\frac{1}{200}$ in. in the model, and this would be a good fit even by engineering standards.

The belt of timbers at the lower deck is quite another matter, and I can think of no supporting evidence apart from the Dutch draught mentioned above. The idea of toptimbers having the same siding as the floors appears unreasonable, but it is possible that to mould a timber with the requisite reverse curve forced the shipwright to use a log big enough to allow for large scantlings at the lower or butt end. It is more likely, however, that the continuous belt had survived from the many (and very controversial) methods first devised to protect a ship's water-line from the gunfire of the enemy. Once again, we should remember that the model maker probably showed in perfection those details which the shipwright could only try to attain with the material at hand. If we had models of merchant ships the evidence might be very different.

The last point under discussion is that the Navy Board model produced a rigid hull of the right shape. I have every confidence that the models reproduce the correct lines of the real ship or draught used. Any other opinion would cast grave doubts on the accuracy of the model maker in other ways, and that would be disastrous if we are to identify models with particular ships. It therefore follows that I am certain that the spacing of the frames is correct, since, unless the model maker redrew the draught from which he worked, correct positioning of frame timbers is essential to obtain an accurate hull. This being the case, does the Navy Board system help the model maker to produce a rigid hull? Speaking as one who has actually built such a model, I have very grave doubts.

Such a model certainly is rigid, but any increase in rigidity over other forms of frame is secured at the expence of a disproportionate increase in the time and trouble taken. Every single timber has to be of exactly the same siding, and if this siding is not absolutely correct the frames at the ends of the ship will be far from their correct place. Also, if one frame is not exactly square to the keel, all the others are thrown out as well. I may add that, after correcting my errors in my own way, I inspected the handiwork of the old model makers with a very critical eye, but without noticing any error to bolster my self esteem which might not have been due to warping induced by age. Ordinary double frames are far easier to handle—they are not so liable to break across the grain,

are just as accurate, and are not lacking in rigidity. The great majority of 'built' models (other than those built for Admiralty use) are planked on frame timbers only without suffering distortion. Neither should we forget those Navy Board models which have only the frame timbers crossed, two out of every three being omitted. On the whole, I cannot agree that close-fitting timbers were used in models merely to obtain a rigid hull.

A minor point arising from the single foothook system, where the siding of all timbers is exactly half the 'room & space', is the effect of the framing on the position of the gunports. In the early models, whenever the width of the gunports was less than the room and space, care was taken to cut the port equally between two toptimbers. In many cases this entailed inequalities in the distance between the ports. In later models the ports are equally spaced throughout, and it appears (although planking obscures details) that if necessary some or most of the toptimbers might be completely cut through. In all models having ports as wide as, or wider than, the room and space, the ports were equally spaced and the cutting of timbers ignored. There are of course many exceptions to the above, but these usually occur at the ends of the model where other factors had to be considered. Now, apart from the appearance of the broadside, the positioning of the gun ports was an important part of the shipwright's art, and I do not think that a model maker would depart from his draught without good reason. I certainly would not suspect him of doing so just to avoid a little more work in framing his gunports. Might it be possible that the spacing of the ports is a guide to the framing of the real ship? In other words, does the framing represent that of the actual ship in those early models with unequal spacing, whilst equal spacing and cut toptimbers indicates that the timbers were ignored *because* the model maker knew they were not representative of the ship?

And now to sum up the position. May we qualify Dr Anderson's remarks somewhat on the following lines: The single foothook frame was commonly used up to 1600, but that by 1660 or soon after it had been superseded by the double frame in one form or another. The double frame was forced upon builders by a growing shortage of curved timber, and beginning with large vessels was quickly adopted in smaller ones once the system was proved. Working from these suppositions, the earliest scale models would be framed with single foothooks because it was a system in general use, and, if timber had been available, would have been used in all ships as the ideal frame. Succeeding model makers would perpetuate the system partly from a reluctance to forget these factors, partly because model making was becoming conventionalized, and partly because, in an unplanked hull, single foothooks have a slight advantage in appearance over double frames and filling timbers.

Why the old fashion should have continued so far into the next century I do not know. It seems incredible that, once models had been made with correct framing, the old tradition should have been sufficiently robust to survive modification by introducing cant timbers, and even stranger that it should appear in paintings such as the series of bow and stern views made for the king in 1773.

It will be seen from these tentative remarks that the main difficulty in discussing the fidelity or otherwise of models as miniatures of the real ship arises, on my part at least, from ignorance of the anatomy of early ships. Many changes must have been from motives of expediency rather than as a result of considered development, just as made masts were first forced on builders by a shortage of suitable timber and not regarded as superior to the single stick whose place they took until a much later date. It would be interesting to know how early foreign models are framed, and how they compare with their prototypes. In fact, any information on the framing of early vessels would be of interest, to the writer at any rate.

W. SALISBURY

KNOTS PER HOUR

In support of J. L.'s note on this subject in the November number, I can quote a number of seamen who have used this term well on into the present century. They probably all went to sea before 1880 (when it seems that it became rigorously taboo), but I cannot believe that what was a correct way of speaking or writing in their youth was wrong in their later years. Surely old terms should

die out with the passing years as they become useless or outmoded, and not be expelled from the language with disgrace.

Your correspondent, A. MacDermott, whom the Navy List shows to be my senior by some years, was doubtless taught in the *Britania*, as I was, that 'knots per hour' was more than wrong: that it was a shibboleth by which sailors could be distinguished from the others. It now seems to me that this teaching was wrong, being both unnecessary (for there is no advantage in clarity of language) and iconoclastic, as a way of killing a term old in origin and of long and distinguished usage.

I am pretty sure that 'knots per hour' (or, perhaps more commonly 'knots an hour') was quite dead in the Royal Navy in 1900. But officers retired at that time used it in print, and well on into the new century. In the list below of those who have favoured 'knots an hour', the dates are dates of publication. Kipling has been included along with the sailors because his use of the term is still occasionally mentioned. The last name on the list is that of a Merchant officer writing his experiences of the 1914 war in this year's November number of the *Nautical Magazine*; I cannot help supporting his terminology although, in this case, I do not use it myself.

Norries Epitome (1877)

Surgeon Gordon Stables (1895)

Francis Norman Martin, R.N. (rank unknown,
writing of the Crimea and earlier under the
pen-name 'Martello Tower') (1899)

Rudyard Kipling (1904)

Joseph Conrad (1906)

Admiral Sir William Kennedy (1910?)

Admiral H. L. Fleet (1922)

Captain A. R. Evans, Merchant Navy (1934)

S. C. Kennedy, Merchant Navy (1953)

The same process of language manufacture still goes on. On being called out in 1939 I found that 'fly' for flags and 'second dog' were condemned as the sign that their user was no sailor. In contrast, 'up the Straits' was tolerated as an archaism; 'Med.' in all its brevity being the current fashion.

S. H. S. MOXLEY

DRAKE'S GAME OF BOWLS

In Vol. 39, no. 2 (May 1953), Christopher Lloyd contributed an interesting note on 'Drake's Game of Bowls', tracing it to William Oldys who, in 1733(?) printed a version quoted from a political tract of 1624. This is a typical example of the survival of an historical anecdote in a traditional form—underground, as we might say—without public assistance from the academic historians. Even when released by Oldys, the story failed to get recognition for another hundred years, but survived.

There is a hint of it some years before the Gondomar Tract of 1624. The following words are found in several editions of Stow's *Annals*; I have traced them to the edition of 1600, at least.

'It was thought that the Spaniards . . . would not come . . . Officers and others kept revels on the shore, dancing, bowling and making merry wen at the instant of the foe's approach.'

Evidently, the anecdote was known, in some form or other. The equally familiar tale of *Wolfe and Gray's Elegy* (which is well-authenticated) was handed down orally but remained unprinted from 1759 until 1815.

C. E. CARRINGTON

RELIEFS ON TOMBS AT PADUA

Mr J. W. Van Nouhuys, while considering the two reliefs on the tombs at Padua (*M.M.* No. 4, November 1952), relates the names Contareni and Michaeli as they appear on the marble plate in their Latin version, though it would seem more appropriate to mention them in their Venetian form which is Contarini and Michiel. Both names refer to prominent local families whose descent can be traced back to the eleventh century, and who were at all times closely associated with the major economic and naval events of the Republic of St Mark. Alessandro Contarini, for whom the first tomb was built, saw much service at sea and was well versed in all naval matters; he thus appears as one of the four members of an imaginary brains-trust debating nautical problems, as conceived by Cristoforo Canal in his MS. *Della Militia Marittima*, written it seems in Venice between 1539 and 1540. (Ed. Libreria dello Stato, Roma 1938.) Those were the days in fact

when the Venetian Admiralty was shifting from trireme galleys, where three oarsmen to a bench pulled a separate oar, to the new system where all oarsmen on the same bench pulled the same oar. In the aforesaid manuscript *missier* Alessandro is supposed to praise the earlier system, though the carved relief on his tomb shows a 'galea sottile' under sail, but with oars arranged the other way. The same plate bears an allusion to the grave events which followed in 1537. At that time Contarini, while cruising off the Apulian coast in command of fifteen galleys which formed the van of the Captain General's Armada, and acting purely on his own initiative, boarded and captured the flagship of a Turkish squadron which happened to be sailing in the same waters. In a clash which followed later, and as a reprisal, Khair-ad-Din (Barbarossa) succeeded in destroying four Venetian galleys, an incident which finally led to a war between Venice and Turkey and brought about a heavy attack on the Venetian island of Corfu, an episode which, however, came to nothing. For his stand in the defence of that fortress, as well as for the gallant fight which he put up off Prevesa (1538), Contarini was given the rank of Provveditore Generale Da Mar, being also acquitted from the charge of disobeying the Government's orders, which in the meantime the Chief State Prosecutor had brought against him, owing to his impulsive action of the year before. The Latin inscription, as previously reported by J. W. Van Nouhuys, shows a few errors and therefore the following words should be corrected:

PERICULOSISS ... TEMPORIB ... HARIADENUS ... OTHOMANICAE ... TIMERIT ... MIRABILI ... QUIDQ
SPLENDORI...PANDULPHUS...OPT...APRILIS.

The second nearby monument is dedicated to the patrician Girolamo Michiel who died in 1557 at the age of 33, but whose deeds yet remain obscure; however, from the words *Rei Navalis Scientia et fortitudine animi inter caeteros praestanti...*, his contribution to the development of the naval architecture of his days, may be deduced, as well as by the nautical symbols which are very clear on the marble relief. In fact, the two craft on each side depict galleys, while the central figure is unmistakably a three-masted galleass, bluff and cumbersome in build, of the type which had been modified by Gian Andrea Badoer in 1550, after the quinquereme built by the humanist shipwright Vettor Fausto had proved a complete failure. (On this subject see F. C. Lane, *Venetian Ships and Shipbuilders of the Renaissance*, p. 64. Oxford University Press, 1934.) Other notable features are the short pointed beak and the poop awning, called *selega* by the Venetians, richly decorated with the Michiel coat-of-arms. Six vessels of this kind formed the advance line of the Christian Armada at Lepanto.

G. B. RUBIN DE CERVIN

QUERIES

5. SAILORS' SEA BAPTISM. In some earlier numbers the ceremony of baptism on passing Cape *Kullen* at the entrance of the Sound has been discussed (*M.M.* 1912, pp. 31, 62, 126, 253). The sailors and passengers on board who for the first time passed those rather impressive rocks had to be ducked three times into the sea from the main yard arm, or to pay a certain sum of money to the old sailors, for brandy, beer, etc. The oldest testimonies of those ceremonies (called *hønsø for Kullen*) go back to the beginning of the seventeenth century, and sailors from the Baltic provinces still used to baptize each other at this place up till our time, although it has been transformed into a regular baptism of the Line (see my treatise in the year-book of the Handels- og Søfartsmuseum på Kronborg 1948, pp. 58-68).

Kullen was the most popular place for sea-baptism in Northern waters during the seventeenth and eighteenth centuries. Another 'international' place, where the baptism was performed, was the Island of *Bokn* (by the Dutchmen called *Buk van Raa*), south of Bergen, Norway. Elsewhere there are a lot of places where local traditions of baptism have been maintained. From other European waters similar places are well-known. The most popular of them were, it seems, *Pointe du Raz* (Brittany), *Barles* (or Berlangas, near Lisbon), and *Gibraltar*.

I possess material on the custom from the following places: 1, *Kullen*; 2, *Høsepollen* (Island of Samsø); 3, Island of *Bornholm*; 4, Cape *Skagen* (Scaw); 5, *Bokn*; 6, *Nordkap* (North Cape); 7, *Nordkyn*; 8, Cape *Lindesnæs*; 9, *Hoburgen* (Island of Gotland); 10, *Landsort*; 11, *Jungfrun* (Island in Kalmarsund); 12, *Långe Jan* (south point of the Island of Öland); 13, *Utklippan* (near Karlskrona); 14, Cape *Ristna* (Island of Dagö); 15, *Domesnäs*; 16, *Travemünde* (near Lübeck); 17, bridge, *Firth of Forth* (Danish ships); 18, the *Channel* (Baltic sailors); 19, *Dover*; 20, *Scilly Islands*; 21, *Land's End*; 22, *Pointe du Raz*; 23, *Saint-Malo*; 24, *Arguenon* (river); 25, *Raz Blanchart*; 26, Cape *Finisterre*; 27, *Berlengas*; 28, Cape *St Vincent*; 29, *Gibraltar*; 30, *Messina*; 31, *Dardanelles*; 32, *St Goar* (town on the Rhine); 33, *Donaustrudel* (swirl in the river Danube).

As I am working on this subject, I would like to ask your readers, if they can provide me with some more material from the mentioned places or from others. References to any literature on the subject are also welcome.

HENNING HENNINGSEN

(Hr. Henning Henningsen's address is: Maritime and Trade Museum, Kronborg, Elsinore, Denmark.—Ed.)

6. NAMES OF MONITORS. In the *M.M.* for July 1936 Dr Parkes gave a list of ships named after a single person in two or more countries. In this he included the names 'Farragut' and 'Stonewall Jackson' and applied them to two of the war-time monitors, nos. 1 and 4. According to 'Fighting Ships' for 1919 Monitor No. 1 was the *Abercrombie* and No. 4 the *Roberts*. At what stage in their careers did they bear these American names?

R. C. ANDERSON

7. PADDLE-STEAMER *ESPLORATORE* ex *VENEZIA*. A model, said to represent this ship, recently turned up in Venice. She appears to have been built in London by Wigram Ltd., in 1862, and to have had a displacement of 1060 tons. Machinery by Penn and Sons Ltd. with 350 h.p. Speed achieved, 17 knots. Two guns of unspecified calibre. Complement, 108. Was purchased by the Italian Government in 1865 and served as scout in the war against Austria in 1866. By 1895 she became a depot ship in Venice, her official denomination being changed to G.M. 10. Was finally broken up before the first World War. Any information about her, photographs or plans, would be much appreciated.

G. B. RUBIN DE CERVIN

8. BARRA CANOE OF GAMBIA. This sailing canoe is depicted on the 2½d. and 2s. values of the newly issued stamps of Gambia. I am interested in obtaining information regarding constructional details, sails, etc., of this canoe.

Native craft of the west coast of Africa seems to have been neglected in any literature I have been able to find on native craft. Can anyone recommend a source for information on this subject?

H. F. RAYL

9. SHIP MODELS IN THE OLD EAST INDIA HOUSE. Does any member know of the present location of the models and other exhibits which were at one time in the Museum or Shipping Office of the old East India House? Two at least of the ship models were of outstanding interest. One represented the *Cornwallis*, Snow, built for the Bombay Marine in 1787. The second was an old model which was thought to be the *Trades Increase* of 1609. References are to be found in 'Some Account of the . . . Society for the Improvement of Naval Architecture', London, 1792; and in 'A Collection of Papers on Naval Architecture' (originally published in the *European Magazine*), London, 1805, Vol. II, p. 72.

W. SALISBURY

10. A LOST TREATISE BY JOHN CHARNOCK. In the Advertisement, dated April 1802, to his *History of Marine Architecture*, Charnock refers to a Supplement which was to be published in the following November at the price of 6 guineas. This Supplement was to consist of 50 pages of text and 48 draughts, English and foreign, of naval and merchant ships. The work was nearly completed, and specimen plates were ready to be sent to the booksellers for whom the *History* was printed.

This work does not seem to have been published. Is anything known of its fate? It seems possible that the price was thought to be too high, and that some of the plates were incorporated in D. Steele's *Naval Architecture* and in Rees's *Cyclopaedia* published a little later by Longman, Hurst, Rees, Orme and Brown. The names of both these booksellers appear in the list of those given in the publisher's imprint on the title page of the *History of Marine Architecture*. It is most regrettable that such an important contribution to our knowledge of marine architecture should have been sunk without trace.

W. SALISBURY

11. FRANK MILDMA. In his book *Frank Mildmay*, Captain Marryat quotes the following lines as introduction to the twelfth chapter:

First came great Neptune with his three-fork't mace,
That rules the seas, and makes them rise or fall:
His dewy locks did drop with brine apace
Under his diademe-imperiall:
And by his side his queene with coronall,
Fair Amphitrite. . .
These marched farre afore the other crew.

Spenser

I wonder, if any of your readers can tell me exactly, where in Spenser's works, I can find these lines?

HENNING HENNINGSSEN

12. ORIGIN OF COASTAL NAMES. Can any reader give me the origin of the following names, which appear fairly frequently on river banks: 'Hung', as in Hungroad (River Avon), Hunger Pill (River Usk) and possibly Hungerford; Wapping, as at Bristol and London; Dunball, or Dumball, Island (River Avon), Dunball (River Parret), and Dumballs (Cardiff)?

G. E. FARR

13. TUG-BOATS. In the days prior to the development of the steam-propelled tug-boat, it must have been necessary to carry out tug-boat duties by means of craft propelled by oars. Was there any special type of craft that was evolved for this work, particularly in the case of large ships?

By what means was the towing rope or cable secured to the 'tug'?

Did they have 'towing hooks' as in the case of the tug-boats of to-day?

What would be the position of the 'point-of-attachment' on the length of the boat? It would need to be well towards the stern to give the rowers plenty of scope.

W. ADAM WOODWARD

ANSWERS

3. (1954). GREEN IN SIGNAL FLAGS. I do not think it correct to imply that signal flags containing green were employed in the recognized British signal codes of the eighteenth century; it is true that in his compilation Admiral Holland shows two numeral flags containing green in Captain Dickson's code of 1780 (see *M.M.*, February 1953, p. 9, folding table). But this was a local code never in official use. During the nineteenth century there is no record of a green flag being used for signalling in the Royal Navy, but as Commander Amme says, some green flags were introduced in 1904 or 1905, and one or more were later adopted and remained in the code until recent years. (See also *M.M.*, January 1947, p. 48, in my own article 'How did the Royal Navy get its Signal Flags?')

HILARY P. MEAD

14. (1953). EARLY SPANISH SEA TERMS; AND ANSWER ON P. 313 OF *M.M.*, NOVEMBER 1953. The terms appear to be Indo-Portuguese rather than Spanish. Bantán is, of course, Bantam, the famous seaport in west Java which was one of the most flourishing Asian trading-ports at the turn of the sixteenth century. For *Catur* see the extensive quotations in Yule and Burnell, *Hobson-Jobson* (ed. London, 1903), p. 175, and S. R. Dalgado, *Glossário Luso-Asiático* (2 vols., Coimbra, 1919-21), Vol. 1, pp. 239-40. I suspect that *cambuco* is the Indo-Portuguese *zambuco* (v. Dalgado, *Glossário*, Vol. 11, pp. 438-9), and Anglo-Indian *Sambook* (*Hobson-Jobson*, p. 788). *Herrada* may be a misprint for *Terrada* (Dalgado, *Glossário*, Vol. 11, pp. 368-9, and a very full description on pp. 84-5 of Padre Manuel Godinho S.J., *Relação do novo caminho que fez por terra e mar, vindo da Índia para Portugal*, Lisboa, 1665, not quoted by Dalgado in this connexion). *Felva* is probably the Indo-Portuguese *jalea* (Dalgado, *Glossário*, Vol. 1, 478; cf. *Hobson-Jobson*, p. 362, sub voce *gallevat*). I cannot identify the other two terms, but their Indo- or Anglo-Portuguese equivalent can probably be traced in the two works above-mentioned. C. R. BOXER

28. (1953.) PEARY AT THE POLE. I think the answer to G. Rawson's query is: there was no way in which Peary could have proved beyond doubt that he had reached the Pole. The Pole being situated in the Arctic Ocean, on a moving ice floe, no permanent erection could have been left to mark the spot. Proof therefore depended on the records of Peary's astronomical observations, which *could* have been faked. On the last stage of his journey, Peary was accompanied by four Esquimaux and his negro servant, none of whom had the knowledge to verify his claim to have reached the Pole.

Had Peary taken Bob Bartlett along, instead of sending him back before the final dash, it might have silenced criticism.

A. MACDERMOTT

28. (1953.) PEARY AT THE POLE. Admiral Peary's claim to have reached the North Pole was investigated very thoroughly by Mr A. R. Hinks, a former Secretary of the Royal Geographical Society. Mr Hinks had made a special study of determination of position near the Pole and published two papers on this matter in the *Geographical Journal* in 1910 and 1926. His investigation of Admiral Peary's observations will be found in a review article 'Peary's Journey to the Pole', published in the *Geographical Journal* for March 1937. The different positions are plotted diagrammatically as position lines, a method which was probably not known to Peary at the time he made his journey. Mr Hinks concludes: 'The results are perfectly consistent with the narrative; the sight at Cape Columbia midnight in the eastern hemisphere was a happy touch; and one could not expect in the circumstances any much better set of observations to prove that a man had been within a few miles of the Pole, except that he should have recorded the watch times for each sight. What is most remarkable is that Peary, having had observed, so far as we are told, only latitudes, or, rather, position lines about local noon athwart his track, on the march northwards, kept so very close to the Cape Columbia meridian; it was a fine piece of steering.' J. M. WORDIE

11. (1953). THE SPAR TORPEDO. The spar torpedo formed part of the standard equipment of all capital ships in the Royal Navy—for use with the steam pinnace—in the 1890's.

It consisted of a charge of gun-cotton at the end of a long pole which passed through an iron guide, and projected over the bows of the boat, the pole being run out and immersed on arriving near the target. Directly the charge came into contact with the hull of the enemy ship (or other object) it was exploded by an electric battery in the boat.

Against a vigilant enemy armed with small quick-firing guns and searchlights its chance of success was negligible.

Exercise with this contraption was carried out once a quarter, if I remember rightly

A. MACDERMOTT

REVIEWS

THE NAVY AS AN INSTRUMENT OF POLICY, 1558-1727. By the Late ADMIRAL SIR HERBERT RICHMOND, edited by E. A. Hughes. Cambridge University Press, 1953. $9\frac{1}{4} \times 6\frac{1}{4}$ inches; vii + 304 pages.

It is unnecessary to spend many words in this *Journal* discussing the qualifications of the late Admiral Sir Herbert Richmond for writing such a book as this. But as neither a professional historian nor a professional sailor but as one who likes to think himself an open-minded sceptic, I feel bound to signify my admiration for one who, while owning to both professions from an eminence, shows so little of the bias, even arrogance, one would expect from such tempting duplicity.

Granted that England was forced soon after the accession of Queen Elizabeth I to forge for herself an instrument of policy; that she had but recently emerged as a nation and found herself, as such, perched provocatively, insularly, strategically at geopolitical cross-roads; granted, in other words, that, if she had not built herself a strong navy when she did and endeavoured to keep it strong, others, Dutch, Spanish or French, would have done it for her and, no doubt, from her, it could be tempting not only to see the instrument larger than life but to mistake drift for policy. Sir Herbert Richmond, as an admiral, might have been forgiven for ascribing to the navy a greater part in Britain's hegemony than is her due and for suggesting that many opportunities were lost through culpable neglect of this instrument by the policy-makers. There are, indeed, traces of the struggle within him, hints of what he would have judged had his judgement been that of a young, devoted sailor rather than that of an elderly Cambridge scholar. But in fact he turns to great advantage his intimate knowledge of the sea, ships and warfare and translates what might have been an overcondensed wad of documentary editing into the sort of brisk narrative the unstudious layman can surprise himself by enjoying.

In an earlier publication, *Statesmen and Seapower*, lectures originally delivered at Oxford, Sir Herbert assumed that his readers accepted the argument inherent in the title of this present book, thus excluding from his company the uninitiated general reader who likes to form his own argument from facts hitherto unfamiliar to him. Now from a mass of material brilliantly marshalled he can watch a sort of gigantic Spithead Review of 169 years of our navy's most formative years and never once feel patronized or put upon. As the panorama unfolds the very questions the author might have answered, as is the way of enthusiasts, before asking become more and more insistent without apparently disproportionate emphasis and one feels oneself arriving at the answers one is sure, if answers are possible, the author would have given. In the main the questions are these: how judiciously did successive governments from Elizabeth and Burleigh on seek to promote English interests by the two types of warfare open to them? Surely they believed—until William III brought over from the continent a new perspective—that it was possible for England to attain supremacy unaided by continental alliance, relying on subtly shuffling the dispositions of her navy to meet the changing conditions on the other side of the Channel? Surely they learned too slowly at the beginning of the period the comparative unimportance of the army as an instrument of policy and unlearned it too slowly at the end? And anyhow what does sea-power involve? On the face of it it should have seemed prudent, in view of the strictly mercantile, import-re-export condition of Dutch existence, to attack her trade rather than her fleet and persist in it. Why did we bungle the three Dutch Wars? And then, as one comes to the Northern and Spanish wars of 1718-27, one realizes that the country, like oneself, has come up with the answers and the correct balance between army and navy, insularity and alliance, has been hit on, and, Glory be, the navy has it. By hook and crook, or, to use an Americanism, enlightened self-interest, Britannia rules the waves; the foundation of English strategy is the navy, the masonry of it is the

army, the scaffolding erected for the builders to climb over and expose to all the elements, we, the lucky people.

Not being a sailor nor a historian, I have one criticism of this great book of over 300 pages of naval history. There is neither map nor chart.

JOHN USBORNE

GALEIEN IN AZIE. By Dr C. NOOTEBOOM. Reprinted from *The Bijdragen, Tot de Taal-land-en volkenkunde*, Deel 108, 4 aflevering. $9\frac{1}{2} \times 6$ inches; pages 365–380 (15 pages); 10 figures in 4 plates. Price not given.

This interesting paper by the Director of the Anthropological and Maritime Museum at Rotterdam opens with a brief discussion of what 'a galley' is (or was), and what part it played in the development of European shipping from classical times to the sixteenth century. He then describes from contemporary sources the various kinds of galleys used by Asian races in the Indian Ocean, Persian Gulf, Indonesian Archipelago and the China Sea, including the types used by the Portuguese, and (to a far lesser extent) by the Dutch. There are illustrations of ten different types ranging from the Persian Gulf to the Moluccas. Fifteen pages do not allow the author to delve into the matter very deeply, and those desirous of further information about such hybrid types as the galliot ('gallywat'), *manchua*, and *jalia* would do well to consult the numerous citations given in Yule and Burnell, *Hobson-Jobson* (ed. 1903), and in S. R. Dalgado, *Glossário Luso-Asiático* (2 vols. Coimbra, 1919–21), neither of which invaluable works the author appears to have used. On p. 370 the author asks where the Spanish galleys in the Philippines came from. The answer is that they were built locally by forced labour at Cavite and elsewhere, although Chinese shipwrights from Fukien were probably employed to superintend the work in some cases.

C. R. BOXER

THE BOMBARD STORY. By Dr ALAIN BOMBARD, translated by BRIAN CONNELL. 12 Thayer Street, Manchester Square, London, W. 1: Andre Deutsch Ltd. 1953. $8\frac{1}{2} \times 6\frac{3}{4}$ inches; 214 pages; 10 illustrations, diagrams and maps. 12s. 6d.

From the earliest days of recorded history, there have not been wanting adventurous mortals who have planned ambitious voyages, with what any prudent mariner would deem totally inadequate equipment, and—have got away with it. Such were the admirals of Necho, King of Egypt, who in the seventh century B.C. accomplished the circumnavigation of Africa, and the Carthaginian Hanno, who fared forth from the Straits of Gibraltar westwards to found colonies in the unknown. Both were received with incredulity on their return; but the 'travellers' tales' that proved them liars to their contemporaries contain the very elements that show us, with our wider knowledge, that they had done precisely what they claimed to do.

Happily, there is no doubt as to the achievement of Dr Bombard. His departure was accompanied by a blaze of unwelcome publicity, he was intercepted on the way, and his arrival at his destination was by no means unnoticed. In the year A.D. 1952 he crossed the Atlantic Ocean, in a dinghy, 'a sort of horse-shoe shaped inflatable rubber sausage, some fifteen feet long and six feet wide', from the Canary Islands to Barbados; and for food and drink he subsisted exclusively on what he could extract from the ocean.

The perils attendant on such a project need no stressing. They were vividly present in the mind of Dr Bombard; yet he persisted, in spite of the strong probability that he would perish miserably from starvation, thirst, tempest or sea monster, because he had a thesis to prove, and the proving of this thesis was to him a thing of greater moment than life itself. The thesis? That survivors of shipwrecks, who are usually given up as lost if not found within ten days, can support life for a much longer period if they make good use of the resources offered them by the sea. 'My object was to give these unfortunates a better chance of reaching land. Several thousand widows less per

year seemed to me an objective fully justifying the risk of one life.' So should we all think; but, when the 'one life' is our own, we might well pause to reflect again. Not so Dr Bombard: and those of us who could not face such hazards can but doff our hats in wondering respect at the spectacle of this indomitable young Frenchman, who deliberately deprived himself of all equipment that a castaway could not be expected to possess and, in addition, shouldered perhaps the most terrible burden of all—complete solitude.

Yet Dr Bombard was neither a suicide nor a crank. A case of provisions was indeed on board, in view of the admitted possibility that the experiment might fail: 'no need to kill myself', he reasonably remarks: but, despite his almost complete exhaustion at the end of the passage, the case was found still sealed at Barbados. Intrepidity *in excelsis*.

The tale that he unfolds is a thrilling one indeed, replete with incident and with hair-raising escapes from the deep and its denizens. Perhaps the most shocking episode was that of the pneumatic cushion (pp. 145–6); but the adventure of the swordfish and many others also can be guaranteed to make the flesh creep. The author tells his story simply and modestly, nowhere straining after effect. He goes thoroughly into the scientific bases of his theory, yet explains himself so that any layman or landlubber can understand the book from start to finish; and the interest never flags.

It is difficult to believe that the original text is French, so admirable is the translation. It is marred by a solitary slip, 'laid' for 'lay' on p. 54, and two unimportant misspellings. Nautical, medical and other technical terms are taken in the translator's stride.

Author, translator and publisher have combined happily in producing this most readable account of a memorable venture. It should be widely read by all whose business it is to sail the seas: for who knows when he may not find himself in sore need of just such a Castaway's Manual?

T. C. GERMAIN

EXPLORERS OF THE PACIFIC. EUROPEAN AND AMERICAN DISCOVERIES IN POLYNESIA. By TE RANGI HIROA (PETER H. BUCK). Bernice P. Bishop Museum special publication 43. Published by the Museum, Honolulu, 1953. 10×7 inches; viii+125 pages; 12 illustrations. \$1.75.

Among the ethnologists who have built up a picture of European penetration from the Polynesian point of view, none made a more distinguished contribution than Sir Peter Buck, for 15 years Director of the Bernice P. Bishop Museum. The monograph under review was completed by the author before his death in 1951, as a 'by product' of his *Introduction to Polynesian Anthropology*, and has been edited by Mrs Eloise Christian.

The foreword, by the present Director of the Museum, characterizes this as 'an important anthropological document, for it describes the early contacts of Polynesians with Europeans and Americans, hence provides a picture of the setting in which the culture change of modern times had its origin'. This is perhaps to claim more for the book than its author intended. He has in fact been content to set down a plain chronological account of expeditions of discovery in the Pacific, and his notices of the native reaction, although authoritative, are few and brief. In general he avoids consideration of the motives (political, commercial, scientific, or religious) which inspired the enterprises. Where he does refer to them he is sometimes naïve or misleading, and when we read that Columbus was 'imbued with the startling theory that the earth was round' it is we, rather than Columbus's contemporaries, who may feel startled. The author's use of Burney in preference to the primary sources, for the sixteenth-century voyages, and of Hawkesworth instead of Wharton, for Cook's first voyage, is to be regretted; and we miss any reference to the physical factors which controlled the courses of voyages under sail in the Pacific.

This is, none the less, an extremely useful book. The author, by discreet selection of detail, unfolds in a straightforward narrative the course of each expedition down to that of Wilkes (1838–42). Every landfall is identified under its modern or indigenous name and related to the

nomenclature of other navigators. This produces such helpful equations as Cocos Island (Schouten 1616) = Boscawen Island (Wallis 1767) = Tafahi; and the author's familiarity with Polynesian phonetics and first-hand knowledge of the islands lend weight to his identifications.

The grand climax in the tale of Pacific exploration is marked by the career of Cook. When his work had been done, 'the only important Polynesian islands remaining to be discovered were the Mangarevan (Gambier) Islands, the northern islands of the Marquesas, and a few individual islands in the Cook and Tuamotu groups'. Yet it is Buck's account of the post-Cook expeditions, arranged 'in national groups' and occupying nearly three-quarters of his text, that will seem to many readers the most valuable part of the monograph. Here we have, digested from the original narratives, a complete catalogue of these relatively little-studied voyages and a careful summary of their discoveries, hydrographic work, and the ethnological information which they collected.

Although inevitably somewhat dry reading, this must be rated an indispensable reference book for the study of Pacific exploration. It deserves a better map than that provided, and there is no list of the twelve half-tone illustrations. A second edition will offer an opportunity to correct the orthography of Loaysa's name (consistently misspelt, Loyasa) and to clear up the apparent confusion (p. 19) between John Davis of Dartmouth, who sailed with Cavendish in 1591, and Edward Davis the buccaneer who, nearly a century later, lent his name to land supposed to lie in the eastern Pacific, sought in vain by later navigators, and wrongly identified by Burney with Easter Island.

R. A. SKELTON

BASIC NAVAL ARCHITECTURE. By K. C. BARNABY, O.B.E., B.Sc., A.C.G.I., M.I.N.A. 2nd edition. Hutchinson and Co. Scientific and Technical Publications, March 1954, $9\frac{1}{4} \times 6\frac{1}{4}$ inches; 460 pages, 65 tables, 133 illustrations. 35s. net.

First published in May 1949. The new edition of this important book is very welcome. Its author is the well-known naval architect to Messrs John I. Thornycroft and Co. Ltd., Southampton. The second edition contains a large amount of new subject-matter, dealing in particular with the extremely important work which is now being carried on both at home and abroad by the model towing tanks for determining the resistance and propulsion of ships. The design of planing forms is also dealt with comprehensively.

Since the publication of the first edition, new methods of deciding the scantlings of merchant ships have come into force. The old numerical system has been abandoned in favour of more scientific methods of relating scantlings to the basic dimensions of the ship with special reference to the moulded draught. These changes are very fully described by the author.

A special and rather unique feature of *Basic Naval Architecture* is the inclusion of a wealth of data and information concerning the design and construction of yachts, launches and speed or power boats, drawn from the long and varied experience of the author. A reference to the 'Gimcrack' sail coefficients is made. Other additions are useful chapters on the launching of ships, corrosion, cathodic protection, structural strength. The latter subject is, of course, of particular interest, and is right up to date dealing with problems involved in the new welding technique.

There are chapters which deal with the design and powering of planing craft, materials of construction, air resistance and sail propulsion which are naturally of considerable interest to those persons concerned either with the building of owning of small craft.

Throughout his book Mr Barnaby has been very careful to give detailed reference to published works of other authors and to the technical papers which have been read before the learned societies or institutions concerned with ships and marine engines. The historical notes throughout this book must appeal to the general reader as well as to the student of naval architecture.

The author and his publishers are to be congratulated on the clarity of the diagrams, drawings and tabulated data given so profusely throughout the text.

G. RIDLEY WATSON

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